COMMONWEALTH AGRICULTURAL BUREAUX

THIRTY-THIRD ANNUAL REPORT

OF THE EXECUTIVE COUNCIL

1961-62

INCLUDING REVIEWS OF PROGRESS
IN THE AGRICULTURAL SCIENCES

LONDON: HER MAJESTY'S STATIONERY OFFICE

FIVE SHILLINGS NET

COMMONWEALTH AGRICULTURAL BUREAUX
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(31st March, 1962)

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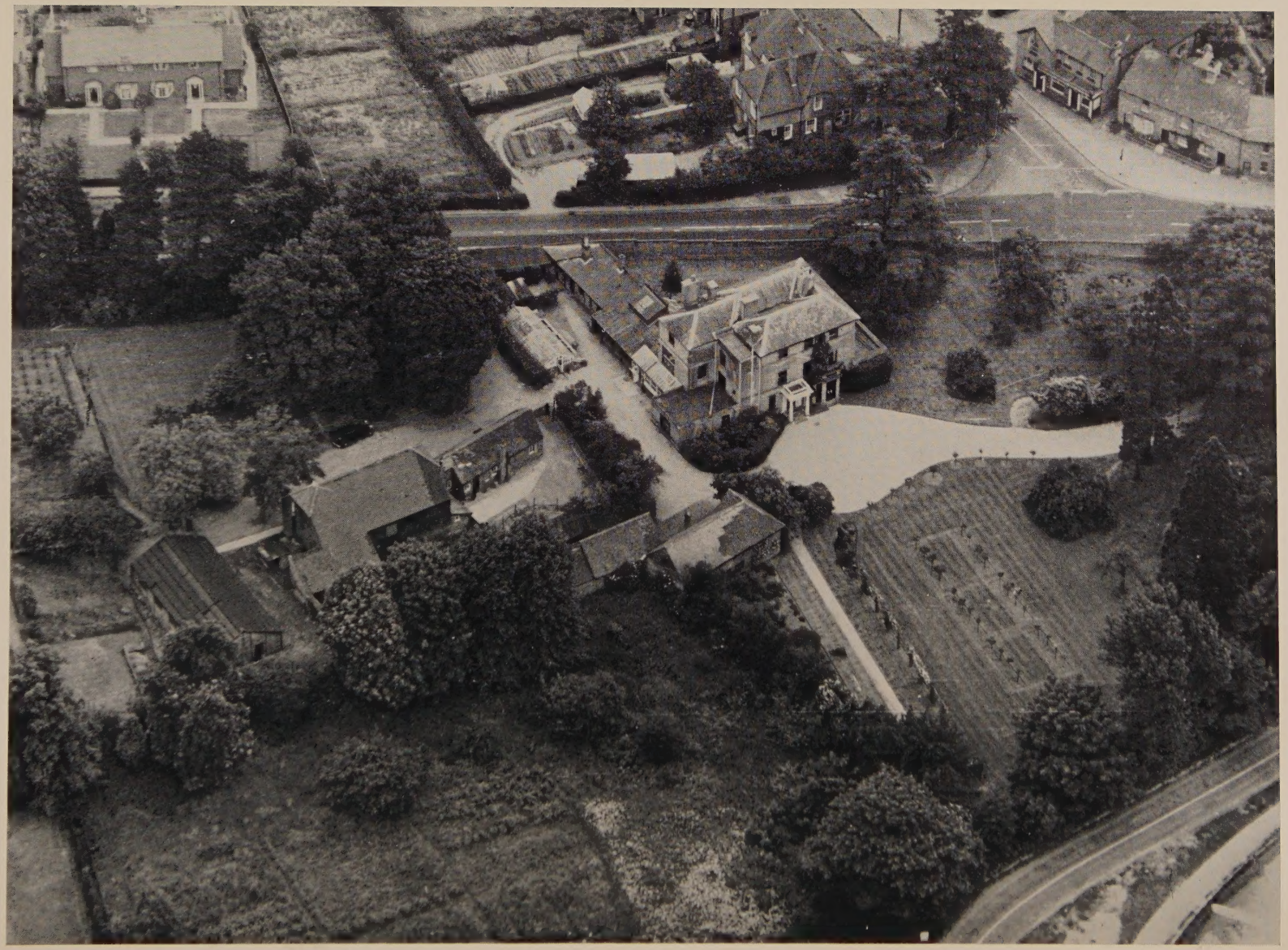

Headquarters Commonwealth Agricultural Bureaux, Farnham House, Farnham Royal, Bucks., England

COMMONWEALTH
AGRICULTURAL BUREAUX

Thirty-third Annual Report

OF THE EXECUTIVE COUNCIL

1961–62

"The Conference is firmly persuaded, as a result of the inspections and discussions which have taken place during its progress, that the Commonwealth Agricultural Bureaux Organization provides an information service on scientific work in agriculture and forestry throughout the world which is of vital importance for agricultural development and thus for the production of food and the maintenance of living standards; that such a comprehensive service is not provided anywhere else and could not be provided by either national or international organizations so cheaply or so efficiently: and that the cost of the service is very small in relation to the value of agricultural and forestry production in the contributing countries."

(*1960 Review Conference*)

LONDON : HER MAJESTY'S STATIONERY OFFICE
1962

CONTENTS

	Page
Frontispiece: Headquarters of the Commonwealth Agricultural Bureaux	
Preface	iii
Report	1
General	1
Recommendations of the 1955 Review Conference	8
Recommendations of the 1960 Review Conference	9
Membership of the Executive Council	14
Liaison Officers	15
Staff Changes	15
Visits Overseas	16
Attendance at Conferences and Committees	17
Visits to Institutes and Bureaux by Overseas Scientists	19
Publications	20
Directors' summaries of their Annual Reports	25
Commonwealth Institute of Entomology	25
Commonwealth Mycological Institute	30
Commonwealth Institute of Biological Control	37
Commonwealth Bureaux	38
Reviews of Progress in the Agricultural Sciences, by Directors	48
Finance	62
List of Sanctioned Staff	64
Statements of Accounts:	
Commonwealth Agricultural Bureaux	65
Commonwealth Institute of Entomology	66
Commonwealth Mycological Institute	67
Commonwealth Institute of Biological Control	68
List of Liaison Officers	70
Addresses	72
History	Appendix I
List of Review Articles	Appendix II
Distribution of Journals, 1961	Appendix III

PREFACE

THE 33rd Annual Report of the Executive Council of the Commonwealth Agricultural Bureaux covering the year 1961/62 appears in a slightly different form from preceding Annual Reports. It has acquired a frontispiece and a new cover. The old Preface, containing a valuable historical résumé of the growth and functions of the organization, now appears as an appendix, as befits a permanent record of this kind. The new Preface is a brief introduction to the events of the year under review.

The pilot scheme for the mechanical retrieval of information about nutrition, based on Dr. Leitch's classification system and a code designed by Mr. Billewicz, was approved after the classification system and the code had been scrutinized and fully supported by the American and European interests concerned.

Approval was given for the removal of the headquarters of the Commonwealth Institute of Biological Control from Ottawa to new buildings in Trinidad, and also for the purchase of land for a new biological control laboratory at Delémont in Switzerland.

The committee of experts appointed to consider the future of the Bureau of Helminthology unanimously recommended that the Bureau should continue as an entity, and that the unity of *Helminthological Abstracts* should be preserved. These recommendations were adopted. Miss S. M. Willmott, Ph.D., Assistant Director of the Bureau, was appointed Director; and Professor B. G. Peters, Ph.D., Head of the Department of Parisitology at the Imperial College of Science and Technology was appointed Consultant Director.

During the year two new independent Member Countries were welcomed to the organization—Sierra Leone and Tanganyika.

The Republic of South Africa on leaving the Commonwealth automatically ceased to be a Member. The loss of one of the founder members of the organization was serious both scientifically and financially. It was not, unfortunately, the only casualty. The Republic of Cyprus and Singapore, although remaining within the Commonwealth, decided to cancel their membership—in the case of Cyprus "for the time being". The year, therefore, has been an anxious one financially.

Nevertheless, the activities of the Commonwealth Agricultural Bureaux have not decreased. For the first time total sales of publications exceeded the £100,000 mark—and by a wide margin. In addition, the Rockefeller Foundation have made a generous grant of over £9,000 for the supply of back volumes to Universities and institutions in South and Central America, India and Japan. Sales to non-Commonwealth countries continued to increase; and foreign subscribers now account for well over half the total output of CAB journals.

V. ARMSTRONG
Chairman of the Executive Council
of the Commonwealth Agricultural Bureaux

Farnham House,
Farnham Royal,
Bucks.

REPORT

THE Executive Council of the Commonwealth Agricultural Bureaux at their meeting on the 29th June, 1962, adopted the following report on their 33rd year of work—1st April, 1961, to 31st March, 1962. This is the last financial year of the review period, 1957/58 to 1961/62.

GENERAL

2. The rising costs of the Organization, coupled with the loss of revenue due to the withdrawal of certain countries from membership of CAB, have given rise to some concern which has not, however, been allowed to interfere with plans for maintaining, and even intensifying, the activities of the Organization. Ways and means were considered whereby expenses might be curtailed, while maintaining an effective abstracting service. With a view primarily to ironing out differences of technique, a very thorough inquiry was undertaken by a Working Party of Directors into the existing methods and costs of producing the Abstract Journals; and a further inquiry was initiated at the end of the year (in consultation with the Organization and Methods Division of the United Kingdom Treasury) into the costs of printing with a view to possible savings. The Executive Council have been examining another possible source of economy, which is that the major contributing countries should hold themselves responsible for abstracting their own literature on behalf of CAB, thus leaving the Bureaux to concentrate on the rest of the world's literature.

3. An encouraging feature of the year was an increase in revenue from the sale of publications amounting to £21,773 largely as a result of an increase in the subscription rates to journals with effect from 1st January, 1962.

4. **The Commonwealth.** The Republic of South Africa ceased to be a member of the Commonwealth on 31st May, 1961, and withdrew from membership of CAB. The Republic of Cyprus, while remaining in the Commonwealth, also decided "for the time being" to discontinue its association with CAB. On the other hand, Sierra Leone and Tanganyika, which became independent States within the Commonwealth on the 27th April and 9th December, 1961, respectively, accepted the invitation of the Executive Council to continue their association with CAB as independent Members.

5. **Council Meetings.** The Executive Council met seven times during the year: once at Farnham House on the 21st June, 1961; once at the Bureau of Pastures & Field Crops, Hurley, on the 26th October, 1961; and on the other occasions at Africa House. The Executive Council also met the Scientific Advisory Committee and the Directors at the Annual Conference held in November 1961 and February 1962, respectively. The Appointments Committee held four meetings under the chairmanship of Dr. A. M. D'Rozario, Council Member for India. The Committee's principal task was to consider applications and to interview selected candidates for appointments to senior vacancies, but it was also called upon to review the whole policy of advertising senior appointments in the Commonwealth and to advise the Executive Council on other matters of procedure and policy. Council also appointed a small committee from among their own Members to examine the terms and conditions of service of the staff employed in the Institute of Biological Control.

6. **Recognition and Awards.** Mr. E. L. Hay, Assistant Secretary, was appointed O.B.E. in the New Year's Honours list.

Miss M. Hall, Scientific Assistant, who retired in March 1961 after 28 years' service with the Bureau of Pastures & Field Crops, was appointed M.B.E. in recognition of her services.

Mr. J. P. Maule, Director, Bureau of Animal Breeding & Genetics, was elected President of the British Society of Animal Production at the Annual General Meeting held at Edinburgh in March 1962.

Mr. Ford Robertson, Director, Forestry Bureau, was nominated as a member of the Governing Council of the Commonwealth Forestry Association: and his name was put forward as the representative of Great Britain on the governing body of the International Union of Forest Research Associations.

7. **Lectures.** Dr. G. C. Ainsworth, Assistant Director, Mycological Institute, delivered lectures to the London Branch of the Institute of Biology, and to the Biological Societies of the University of Birmingham and of Bedford College, London.

Mr. M. Crawford, Director, Bureau of Animal Health, gave an address on the work of the Bureau to the Annual Conference of the Veterinary Students' Association at Glasgow.

Mr. E. J. Mann, Director, Bureau of Dairy Science and Technology, gave a lecture entitled "Handling the world's dairy literature" at the Annual Meeting of the American Dairy Science Association held at Madison, Wisconsin, USA, in June 1961.

Dr. P. S. Hudson, Director, Bureau of Plant Breeding and Genetics, gave a lecture on the "Commonwealth Agricultural Bureaux" to Colonial Agricultural Probationers on 3rd August, 1961.

Mr. G. V. Jacks, Director, Bureau of Soils, took part in a discussion of "Irrigation practices in Africa" in the Third Programme of the B.B.C. on the 13th March, 1962.

8. **Accommodation.** In October 1961, the Secretary and the Director of the Institute of Biological Control visited the European Station of the Institute at Delémont. The existing accommodation of the Institute, which is rented, is to be demolished on the expiry of the lease in 1967; but the lease can be broken in 1964. Suitable accommodation cannot be rented in or near Delémont; to move the Station to another area altogether would be expensive, and the Delémont area is suitable from a scientific point of view. As the local authorities at Delémont were willing to sell to Council at a nominal price a suitable site for a new building, Council, in accordance with Recommendation (57) of the Review Conference, 1960, decided to proceed with the purchase of the land and approved the plans for the new building.

The plans for the new building of the Institute of Biological Control in Trinidad were altered to provide accommodation for the Headquarters Office and that of the West Indian station. The building has now been completed.

With the completion in August 1961, of the fourth storey of the Commonwealth Forestry Institute building, additional accommodation was allocated to the Forestry Bureau by the Institute. This additional accommodation will meet the needs of the Bureau for some time to come.

The building in which the Bureau of Soils was housed, has been converted and

extended by the Rothamsted Experimental Station and the Bureau has been allocated additional well-appointed accommodation.

9. **Special Projects.** Several long-term projects are in preparation at the Mycological Institute, including a *Bibliography of Plant Pathology*, a *Plant Pathologist's Handbook*, and the 40-year host/pathogen index to the *Review of Applied Mycology*. Much progress has been made with the scheme to issue "working sheets" of important economic fungi and a prototype sheet has been prepared for photo-offset reproduction in consultation with a number of leading pathologists and incorporating the recommendations of the 1960 Commonwealth Mycological Conference.

Mr. E. J. Mann, the Director of the Bureau of Dairy Science and Technology, served on a small Working Committee appointed by the International Dairy Federation and charged with the task of producing a multilingual dictionary of dairy terminology (English, French and German). These multilingual glossaries are not considered a function of CAB, but Directors have been urged to assist in their production if they can do so without detriment to their substantive duties.

An extended abstract of an important Russian work, in 596 pages, on Cultivated Plants and their Wild Relatives, by P. M. Zhukovsky, has been completed by the Bureau of Plant Breeding and Genetics; it embodies some 50 thousand words, and is being published in photo-offset form by the Reprinting Unit at Farnham Royal.

10. **General Publicity.** Dr. G. M. Carman, CAB Liaison Officer in Canada, presented a paper to the Tenth Pacific Science Congress held in Hawaii from 22nd to 26th August, 1961, in which he dealt at some length with the Commonwealth Agricultural Bureaux. The paper elicited a good deal of favourable comment, particularly from the South-Eastern nations and from the Japanese and Americans.

In their Animal Health Year Book for 1960, FAO published an article generally describing the work of CAB and in particular that of the Bureau of Animal Health. CAB publications were displayed in a prominent position at FAO Headquarters in Rome during the 11th Session of FAO in November 1961. Mr. D. Akenhead, former Director of the Bureau of Horticulture and Plantation Crops, who happened to be in Rome on a temporary assignment with FAO, was good enough to keep an eye on the exhibit.

Generally speaking, it is the publications themselves which provide the best publicity for CAB, but efforts are being made to draw more attention both to them and to the CAB Organization as a whole. A shorter and more readable version of the Conspectus is being prepared; an illustrated CAB booklet was under preparation by the Central Office of Information and has since been published.

11. **Sales in America.** Sir Herbert Howard's sales tour in January/February 1961 is beginning to show dividends, though it is too early yet to judge the result of the advertising campaign which was undertaken as a result of his recommendations.

The Rockefeller Foundation has very generously made grants totalling $29,500 for the supply of back volumes of CAB journals as gifts to selected agricultural libraries in Latin America, India, Japan and Manilla. The potential revenue to CAB is even greater than these figures suggest, as the supply of the back volumes is conditional on subscriptions being taken out and maintained for the 1961 and subsequent volumes. In addition, booksellers in the USA interviewed by Sir Herbert Howard during his tour placed orders amounting to $4,385 for back volumes of CAB journals.

12. **Methods and costs of preparing CAB Abstract Journals.** In the course of their visits to Institutes and Bureaux, delegates to the CAB Review Conference, 1960, noted differences, which did not appear to be justified, in method, technique and efficiency in the preparation of the Abstract Journals and were in favour of the appointment of an independent efficiency expert to look into the whole matter—Recommendation (23). Directors however accepted the responsibility of making this investigation themselves and, with the approval of Council, appointed a Working Party consisting of Mr. A. G. G. Hill (Chairman), Dr. J. C. F. Hopkins and Mr. E. J. Mann, to conduct the inquiry.

The Working Party based its findings on the answers received from Directors to a long Questionnaire comprising 117 items. The draft of a paper containing various recommendations arising out of the Working Party's report was then prepared by the Secretary and agreed with the Consultant Directors and Directors. This paper was discussed by Council at their Annual Conference with Directors on the 7th February and again at the Council Meeting on the 9th March, 1962.

The inquiry revealed wide variations of methods and costs in the production of CAB Abstract Journals, and indicated the desirability of eliminating these differences as far as possible. Council however decided to defer action on the recommendations arising out of the Working Party's report, pending a further investigation into the costs of printing CAB publications. This further inquiry was entrusted to Mr. L. H. Bunker of the Organization & Methods Division of the United Kingdom Treasury. Meanwhile, Council welcomed an assurance from the Directors that they would re-examine each other's methods individually and in more detail with a view to adopting those methods which were calculated to improve the efficiency of their own units.

13. **Biological Control.** Council authorized the transfer of the headquarters of the Institute of Biological Control from Ottawa to Trinidad, and with the virtual completion of the new Trinidad Station building at the end of the year under report, arrangements were being made to effect the transfer which actually took place on 18th June, 1962.

It may be of some interest to show at this juncture the increase in the work of the Institute in the past few years:

	No. of Projects	*Shipments Made*	*No. of Species Shipped*	*No. of Individuals (approx.)*	*No. of Countries Receiving Shipments*	*Project Funds (approx.)*
1958/59 ...	27	278	48	440,000	13	$40,000
1959/60 ...	39	644	81	770,000	20	$54,000
1960/61 ...	52	658	98	450,000	20	$98,000
1961/62 ...	90	764	164	470,000	31	$160,000 (estimated)

This has been accomplished with a staff of permanent entomologists which has risen from only 9 in 1958/59 to 11 in 1961/62. The staff of temporary entomologists has risen from 3 to 20 in the same period: but nearly all of them are paid from project funds.

14. **Helminthology.** At the CAB Review Conference, 1960, some delegates expressed the view that it might be economical to divide the work of the Bureau of Helminthology among the other Institutes and Bureaux; and a committee of three delegates, namely, Prof. T. W. M. Cameron (Canada), Mr. G. A. Gill (Australia) and Dr. F. N. Bonsma (South Africa) submitted a report on the Bureau's taxonomic and identification service which they recommended should be discontinued.

The resulting Review Conference Recommendations (72) and (73) tended to have an unsettling effect on the Bureau; the Bureau was without the services of a permanent Director; and a permanent Director could not very well be appointed while the future of the Bureau was still in the melting pot. The Executive Council had accordingly taken early steps to appoint a small committee of Council to decide on the composition and precise terms of reference of a Committee of Experts to look into the future of the Bureau in all its aspects, including the continuation or otherwise of the taxonomic unit.

The Committee of Experts so formed under the chairmanship of Dr. E. L. Taylor, C.B.E., included Mr. J. E. C. Coventry, Member of Council for the Federation of Rhodesia and Nyasaland, Professor Buckley, Professor Peters and Mr. Jones. It met five times during the period March to June 1961, and its recommendations were adopted by the Executive Council.

The recommendations were that the Bureau should continue as a separate entity and continue to be located at The White House, St. Albans; that the Taxonomic Unit be retained and expanded, as opportunity offers and funds permit, to deal with the taxonomy of plant nematodes; that a Consultant Director be appointed; that Dr. Willmott, the Acting Director, be appointed substantive Director; and that *Helminthological Abstracts* should continue to be published as a single volume.

15. **Nutrition.** Work continued on the Classification of Knowledge of Nutrition. The scheme was modified, expanded and fully revised and there were included in it those suggestions that were considered advantageous from among those put forward as a result of the circulation of the draft in the Commonwealth, Germany and the United States of America. A letter of commendation was received in November from the Food and Nutrition Board of the U.S. National Academy of Sciences:

> "In executive session on 11 November, 1961, the Food and Nutrition Board instructed me to send you this letter of commendation on the forthright and effective manner in which the Commonwealth Agricultural Bureaux and the Commonwealth Bureau of Animal Nutrition have proceeded with the development of machine methods for documentation and retrieval of knowledge in food and nutrition."

A two-day informal conference was convened in London in October 1961 and was attended by representatives of the Food Research Advisory Committee of the Ministry of Agriculture, Fisheries and Food, the Food and Nutrition Board of the U.S. National Academy of Sciences—National Research Council, *Biological Abstracts*, FAO and the Discussion Group which met in 1960 at Karlsruhe. The Commonwealth Agricultural Bureaux were represented by Sir Thomas Scrivenor, Dr. Harvey, Mr. Mann, Dr. Leitch and Mr. Billewicz. The conference noted with satisfaction that the Executive Council of the Commonwealth Agricultural Bureaux had sanctioned the preparation of punched cards for the information contained in *Nutrition Abstracts and Reviews* and had approved the hiring of a sorter for the mechanical retrieval of that information. The conference

suggested that the particular needs of food technology in both research and industrial aspects would need separate consideration in respect of, first, an extension of the classification system and, secondly, if the process of application to abstracts were to be followed, the establishment of an abstracting journal for that branch of food science.

With the classification in its final form and the fitting of the code completed by Mr. Billewicz, the whole was ready for printing in book form. The end of the year also saw the completion of temporary accommodation which, with the permission of the Director of the Rowett Research Institute, had been erected at the rear of the Reid Library building. These events saw the attainment of the first stage of Recommendation (65) of the Review Conference, 1960. It forms the basis on which work on the second stage may now proceed, namely the preparation of the punched cards, one for each of the 160,000 numbered entries in the 31 volumes of *Nutrition Abstracts and Reviews*.

16. **Food Science and Technology.** At the Review Conference in 1960, the possibility of CAB's publishing a Food Science Abstracts journal was discussed but no decision was taken. A recommendation was passed asking the Executive Council to investigate this possibility and report back to the next Review Conference.

Since this Conference took place, interest in this subject has been intensified by the following events:

(a) A Conference, called to discuss primarily the Aberdeen classification scheme for nutrition in October 1961, expressed the need for an abstracting service in food technology.
(b) The Institute of Food Technologists in the United States of America formed an *ad hoc* Committee to study and report on the desirability for such a service.
(c) The CAB accepted an invitation to send a Delegate to a Conference on Food Abstracting and Documentation at East Lansing, Michigan, organized by the American Institute of Food Technologists.
(d) The Food and Nutrition Board of the National Research Council (USA) appointed Professor J. C. Moyer of Cornell University to make a survey of the needs for a Food Abstracting Service and of the required scope of such a service.
(e) In the U.K., the Working Party on Food Science Abstracts of the Food Research Advisory Committee to the Minister of Agriculture, Fisheries and Food has maintained a watching brief on developments.

The case for CAB interest in the food documentation field is strengthened by the fact that the Agricultural Research Council in the U.K. has extended its interests into the food research field and that several Commonwealth countries have recently established or are about to establish food research institutes.

From a different angle, the Bureau of Dairy Science and Technology has a special interest in this subject since a fusion of dairy and food interests appears to have been taking place during the last few years. This trend has been apparent at the educational level, where Dairy Departments at Universities have absorbed or have become absorbed by Food Departments, at the research level as well as at the industrial level where a number of traditional dairy firms have extended their interests into the general food field.

17. **Information and Identification Services.** The number of identifications made by the Institute of Entomology on behalf of correspondents in Asia has shown a pronounced

upward trend during the past three years and in 1961/62 was some two and a half times that of 1958/59. This increase is attributable in large measure to the entomological surveys being conducted by the Indian and Pakistan Stations of the Institute of Biological Control.

18. Requests for information on biological control continue to be numerous both at the Headquarters of the Institute of Biological Control and at each Station. The most interesting are those which eventually develop into definite projects. When requested, particularly if several areas are interested in an important pest, memoranda are drawn up outlining what the Institute considers to be the possibilities for biological control. To further this, a summary of the work carried out during the calendar year 1961 was prepared to indicate the scope of the Institute's activities and the problems being investigated at the time.

19. The following examples of the inquiries dealt with by the Bureau of Animal Breeding and Genetics give an idea of the variety of subjects involved:

(a) Dr. H. P. Donald, Director of the Animal Breeding Research Organization, wished to know whether there was any information on parturition difficulties in crossbred *Bos taurus* × *Bos indicus* (Zebu) cattle, due to disparities in the size of the two parents. From correspondence with a number of people in the tropics it emerged that difficulties had not been noticeable in such crossbreeding.

(b) A British research worker in the USA asked for references to work on the influence of environmental effects on selection and especially to work done at Edinburgh with mice. A list of the references was supplied.

(c) An inquiry from Malaya sought information on the development of artificial insemination in pigs in Britain. A photocopy of a general account of pig A.I. in this country, a list of references and a copy of the latest report of the Agricultural Research Council containing a report on this subject were supplied.

(d) Three requests (from India, Peru and Uruguay) were received for sources of bovine semen for export. A company was recently formed, representing the breed societies and artificial insemination organizations, and these requests were referred to this company.

20. Among inquiries dealt with by the Bureau of Animal Nutrition were requests from the Zoology Department, University of Western Australia, for information on the feeding and nutrition of marsupials and from the Wildfowl Trust on grazing by wild geese.

21. The following are reported by the Bureau of Animal Health:

"(a) *Effects of blast on pregnant cows.* This arose out of the use of explosives for felling trees.

(b) *Salt supplements for dogs in tropical countries.* This came from the Royal Army Veterinary Corps which uses considerable numbers of tracker dogs and guard dogs in hot climates. It is apparently customary to give men doing physical work in the tropics sodium chloride tablets and we were asked whether this was necessary for dogs. Information was available regarding the salt requirement of dogs in temperate climates and some concerning sledge dogs in the Arctic but we were unable to find any publication dealing with tropical conditions. The opinion

was expressed that bearing in mind the nature of the diet fed to Army dogs and also that sweating in dogs was restricted to a much smaller part of the skin area than is the case with man, it would be unlikely that the addition of salt to the diet would be necessary.

(c) *Incidence of keds in sheep-rearing countries.* In attempting to reply to this inquiry information was sought from a number of Veterinary Investigation Officers located in the more important sheep-rearing areas of the U.K. It transpired that with the use of modern long-acting types of parasiticides for dipping and spraying sheep for the control of blowflies and sheep scab the ked population had been so drastically reduced that in some areas they are practically wiped out. As one informant put it "up to 1949 hill sheep were so heavily infested with keds that it was quite a problem to 'de-ked' oneself after handling sheep but I cannot recollect having seen a ked in the past five years". This is really a side-effect since the new types of dipping preparations were not directly aimed at keds but rather at blowflies, ticks and mange mites. Precise information on the situation in other countries was not available but no doubt the position in other countries such as Australia, New Zealand and the USA where the newer parasiticides are regularly used would be much as it is in the U.K.

(d) *Foot and Mouth disease in elephants.* This inquiry came from the Pirbright laboratory; the reply was that no authentic records of this disease in the elephant could be found in literature.

(e) *Photosensitization.* The Governor-General of Tasmania who sought information on the subject was supplied with a copy of our Technical Communication No. 3."

22. The specially designed system of information retrieval of the Bureau of Soils enabled that Bureau to produce 86 fully annotated bibliographies of which altogether some 4,000 copies were distributed to research workers and others.

The punched card file system at the Bureau of Plant Breeding and Genetics also makes it possible to prepare bibliographies easily and quickly, and 12 inquiries on these lines have been dealt with for workers in Canada, the topics covered embracing interspecific hybridization in lucerne, clover and birdsfoot trefoil, cytogenetics of oat species, soya bean, red clover and melons, resistance to drought in wheat and rot in sunflowers, shape of plots in testing cereal varieties and competition in cereals. Inquiries of this type from India concerned hybrid vigour in tobacco and cytology of cucumber and one from Pakistan concerned cross pollination in cotton. Similar inquiries have been received from several African territories, from Australia and from various countries outside the Commonwealth.

RECOMMENDATIONS OF THE 1955 REVIEW CONFERENCE

23. Action on these recommendations was reported to the 1960 Review Conference in Appendix I of the report of that conference. Further action was reported in the annual report for 1960/61. What follows is action taken in 1961/62, that is, up to the end of the quinquennium which coincides with the closing date of this annual report.

This finally disposes of the recommendations of the 1955 Review Conference. Recommendations reaffirmed or modified by the 1960 Review Conference will be dealt with in the next succeeding section.

The numbers quoted are the recommendation numbers in paragraph 21 of the 1955 Review Conference report. For economy, the recommendations themselves are not printed.

Recommendation (*5*) *and* (*6*). Biological Control projects have been carried out for the USA (and for its Trust Territories of the Pacific Islands), USSR (on an exchange basis for material supplied to Canada), Taiwan (on an exchange basis), Portugal, Mexico, Switzerland, South Pacific Commission and also for Cyprus and South Africa. Much of this work has consisted in shipment of easily procurable material and has not interfered in any way with Commonwealth projects.

Recommendation (*8*) (*b*). The Official Correspondents for India and Southern Rhodesia are reported to have visited the Bureau of Dairy Science and Technology.

Recommendation (*8*) (*d*). The Director, Institute of Biological Control, met his Official Correspondents in Barbados, the Bahamas, Brunei, Canada, Hong Kong and North Borneo.

Recommendation (*11*). The qualifying period for acting allowance has been reduced from 61 to 35 days.

Recommendation (*18*). The Executive Council have urged upon Directors the desirability of publishing the indexes within four months of the close of the volumes to which they relate.

Recommendation (*29*). Financial stringency has prevented the expansion of abstracting staff that was recommended, the quinquennium finishing with only 11 in grade C (8 engaged on abstracting and indexing), as against the 13 recommended (of whom 10 would have been on abstracting and indexing).

Recommendation (*35*) (*c*). A start has been made but the Bureau of Helminthology as yet has no reference collections available for distribution.

Recommendation (*35*) (*d*). Advice has been given on request.

RECOMMENDATIONS OF THE 1960 REVIEW CONFERENCE

24. The recommendations of the 1960 Review Conference theoretically only came into force with the opening of the Review Conference period, i.e., the day after the closing date of this annual report. The fact, however, that the first task of the Interim Conference in 1963 would be to review the extent to which the recommendations of the 1960 Review Conference had been implemented, made it incumbent upon the Executive Council to take advance action wherever possible. This was all the more necessary as certain recommendations of the Seventh Commonwealth Entomological Conference had been remitted to the Review Conference for consideration and were awaiting action on the Review Conference recommendations.

25. A "mopping up" operation was mounted to see how and when action could best be taken, as a result of which a number of the non-controversial recommendations were disposed of by bringing them to the notice of Council Members and Directors; these are not mentioned below and reference is made only to those recommendations on which some positive action was taken during the year.

26. For economy, the recommendations themselves are not printed, but the references given are to the recommendation numbers in paragraph 20 of the 1960 Review Conference report.

Recommendation (*2*). The Executive Council are following this recommendation by holding their meetings at Institutes and Bureaux, and by Members paying personal visits, as opportunity offers.

Recommendation (*3*). At the request of the Rockefeller Foundation, CAB assisted in the preparation of a Rice Bibliography to serve the needs of developing countries, and collaborated with American interests in the fields of Nutrition and Food Technology —see paras. 15, 16.

Exchange of biological control material has continued with Hawaii and has been developed with Taiwan. It is hoped that further co-operation with Far Eastern countries will also develop. Projects in both India and Pakistan financed with Public Law 480 funds from the USA have increased; work on these is progressing satisfactorily and will certainly be of value to Commonwealth countries. Work has been carried out on the Institute's behalf in Czechoslovakia, material obtained from French authorities for Mauritius and Australia, and investigations started at the American University, Beirut, Lebanon, for the same two countries.

Recommendation (*4*). The Liaison Officer in New Zealand convened a meeting of Official Correspondents on 8th December, 1961. A similar meeting of Official Correspondents was being arranged by the Liaison Officer, Australia, for May 1962.

Recommendation (*5*). The facilities hitherto provided to visiting scientists to work temporarily at Institutes and Bureaux are now being extended—see paras. 65, 66.

Recommendation (*10*). After discussing the matter with Directors at the Annual Conference on 7th February, 1962, Council have postponed a decision for a year when more experience will have been gained by those Bureaux which are experimenting with local abstracts.

Recommendation (*17*). Council noted that the terms of this recommendation were to some extent at variance with Recommendation (16) and decided that they could not accept the terms of Recommendation (17) insofar as they applied to the *Bulletin of Entomological Research*.

Recommendation (*20*) (*b*). In at least one instance, the Governments of the territories visited by a Director have contributed towards his air fares, in addition to meeting his travelling and subsistence within their borders.

Recommendation (*22*). The quota for CAB and grant-in-aid journals has been increased as from the 1962 volumes. The mechanics of this operation have entailed a fair amount of additional work for all concerned.

Recommendations (*23*) *and* (*25*). The report of a Working Party appointed by the Directors to examine each other's methods and techniques was presented to Council, who welcomed the report but sought further advice from the Organization and Methods Division of the Treasury on the savings to be achieved in the cost of printing CAB journals—see paragraph 12.

Recommendation (*26*) (*a*) The annual subscription rates for CAB journals were increased as from the 1962 volumes.

(*b*) A special rate for Government and State-aided institutions in contributing countries who ordered direct was also introduced as from the 1962 volumes.

(c) This is being borne in mind in fixing the prices for occasional publications as and when they are issued.

Recommendations (*30*) *and* (*64*). *Veterinary Reviews and Annotations* ceased publication with Volume 7 (1961), and review articles have been included in the *Veterinary Bulletin* as from Volume 32 (1962).

This journal was started in April 1955 and the Director reports that during its seven years of publication the annual subscriptions increased from 234 to 511 and the total distribution from 419 to 712. During that time the total revenue from sales was £4,327; there was also a small revenue from advertisements. The total cost of printing (by photo offset) over the seven years was £2,827.

Council have directed that review articles should continue to be published in CAB abstract journals and that those Directors who do not publish them should consider doing so.

Recommendation (*32*). The List of Research Workers, 1962, was under preparation, and the attention of Directors was drawn to that part of the recommendation which discourages the publication of sectional lists.

Recommendation (*33*) (*a*) *and* (*b*). "Notes of Progress in the Agricultural Sciences", re-entitled "Reviews of Progress in the Agricultural Sciences", are to be contributed by Directors, in language intelligible to the non-scientist, at least once in three years, with additional contributions whenever possible.

Recommendation (*33*) (*c*). The words "including Reviews of Progress in the Agricultural Sciences" are being prominently displayed on the cover of the Annual Report.

Recommendation (*33*) (*d*). A list of review articles published during the year is included as Appendix II to this Annual Report.

Recommendation (*34*). *Commonwealth Phytopathological News* has been allowed to continue for the time being, pending proposals from the Director, Mycological Institute; and Liaison Officers were consulted on the desirability of Headquarters issuing a periodical newsletter.

Recommendation (*36*). CAB was represented at various meetings held during the year to discuss the problems of documentation for food science and technology. For further details, see paragraph 16.

The text of a paper entitled "The contribution made by CAB in the documentation of food science & technology literature" was approved by Council for presentation at the 1st International Congress of Food Science & Technology to be held in London in September 1962.

Recommendations (*37*) *and* (*74*). The Review Conference felt that in publishing "Digests", the Bureau of Horticulture & Plantation Crops had gone outside the functions of CAB. Discussions with the Scientific Advisory Committee, however, revealed that while some Technical Communications were admittedly more "technical" than others, there were definite advantages in publishing from time to time surveys of literature on matters that were of more practical than of theoretical interest. Council therefore decided that the publication of such surveys should continue, not under the title of "Digests", which was apt to be misleading, but as Technical Communications.

Recommendation (*39*). As the Conspectus was due for revision, an attempt was at first made to turn it into a short publicity pamphlet. This project was, however, abandoned in favour of an illustrated brochure based on a CAB Exhibit which had been prepared some years ago and was out of date in some respects. The brochure was

being prepared by the Central Office of Information, and a revised version of the Conspectus had also reached an advanced stage of printing by the end of the year.

Recommendation (*40*). The disclaimer at present in use has been reviewed and found adequate for the purpose.

Recommendations (*41*) *and* (*42*). Steps taken to eliminate the backlog of papers to be abstracted and increase coverage have had the effect of increasing the size of the *Review of Applied Entomology* by 22·5% in terms of number of pages and 50·4% in terms of numbers of abstracts.

Recommendation (*43*). The mean length of abstract has been reduced from 0·43 page (1960 volumes) to 0·35 page.

Recommendation (*44*). The backlog in indexing has now been overcome, and printing of the Index to Series B (1961) was complete by 31st March, 1962.

Recommendation (*45*). Following representations made by the Director, the Zoological Society of London increased its contribution towards the cost of preparing the *Zoological Record* part *Insecta* from £500 to £700 per annum.

Recommendation (*46*) (*b*). A scientifically trained abstractor appointed on the equivalent part of the A/B grade subsequently resigned, after 5 months' training.

Recommendation (*48*). As a first step, the *Distribution Maps of Plant Diseases* have been made more international in character by inserting the Latin as well as common names of host plants.

Recommendation (*50*). A sum of £2,500 has been budgeted for the purpose, but the purchase of the greenhouse has not yet been sanctioned.

Recommendation (*51*). Certain exploratory action has been taken, namely, to seek an assurance from the local council that formal planning permission to extend the new building of the Mycological Institute will be forthcoming to offset any loss of accommodation resulting from the sale of the houses facing Kew Green at some future date.

Recommendation (*52*). An Assistant Director was appointed at the Mycological Institute with effect from 1st April, 1961.

Recommendation (*55*). Several projects have been developed during the year in which more than one country is contributing funds to the same project. These are: Potato tuber-moth: Australia, Bermuda, Canada, Mauritius, New Zealand, Cyprus; Californian red scale: Australia, Cyprus, South Africa; Sugarcane borers: Barbados, Grenada, Mauritius, St. Vincent, West Indies, Mexico, USA; Codling moth: Canada, USA (University of California); Balsam woolly aphis: Canada, USA; Mediterranean fruit fly: Australia, Mauritius; Phytophagous snails: Bahamas, New Guinea, North Borneo; Rhinoceros beetle: Cocos Islands, North Borneo, South Pacific Commission. The Director hopes that other projects will also be developed in due course since there are many pests where such co-operation would be advantageous; he anticipates difficulty, however, in getting several countries sufficiently interested at the same time in individual pest species to allocate funds in this way.

Recommendation (*56*). Council sanctioned the transfer of the headquarters and accounts of the Institute of Biological Control from Ottawa to Trinidad. The move of the headquarters was expected to take place soon after the close of the financial year, but negotiations were in progress with the Canadian Treasury for their agreement to continue to keep the Institute's accounts.

Recommendation (*57*). Council have authorized the construction of a new laboratory at Delémont—see paragraph 8.

Recommendation (*58*). The West Indian Station building has been completed—see paragraph 8.

Recommendation (*60*). An additional Entomologist was appointed and posted temporarily to Delémont, pending the provision of accommodation in East Africa to house the nucleus of a Station there. The Entomologist was subsequently transferred to Kawanda upon receipt of information that the Government of Uganda had very generously provided furnished accommodation both for him and for the laboratory. The purchase of the necessary laboratory equipment was also sanctioned.

Recommendation (*61*). The part-time indexer at the Bureau of Animal Breeding and Genetics has been replaced by a full-time Scientific Information Officer.

Recommendations (*62*) *and* (*63*). Both these recommendations were found to refer to the *Index Veterinarius*. In that context, the first was ambiguous and the second too costly. Council therefore decided not to take any action on either recommendation.

Recommendation (*65*). Action taken—see paragraph 15.

Recommendation (*67*). The Bureau's requirements for additional space have been taken into account in plans for the extension of the Reid Library.

Recommendation (*71*). An Indexer has been appointed at the Forestry Bureau.

Recommendations (*72*) *and* (*73*). The Committee of Experts appointed by the Executive Council to inquire into the affairs of the Bureau of Helminthology made certain recommendations which were adopted by Council without reference to the Interim Conference, 1963—see paragraph 14.

Recommendation (*82*). The Director, Bureau of Soils, reports that only about half of the abstracts made are printed. Every abstract made is considered to be worth recording and storing, but not necessarily to be worth printing (e.g., there are dozens every year on potato-manuring). About £1,000 a year is reckoned to be saved by not printing these scientific but repetitive abstracts—a worthwhile saving. The recommendation has continued to be followed. "Popular-type" journals have never been abstracted except when they contain informative articles.

Recommendation (*83*). Three extra rooms have been provided for the use of the Soils Bureau—see paragraph 8.

Recommendation (*85*). A grant of £1,000 was paid to W.A.E.R.S.A. in 1961/62, in accordance with clause (d), and contributing countries were asked in accordance with c(ii), to provide the journal with abstracts free of charge.

Recommendation (*87*). A grant of £5,000 was paid to N.I.A.E. during 1961/62.

Recommendation (*88*). A grant of £1,500 was paid to the Bee Research Association during 1961/62.

The Director, Institute of Entomology, has been authorized to attend meetings of the B.R.A. Council as an observer.

Recommendation (*89*). By arrangement with the Agricultural Research Council, the production and distribution of *Weed Abstracts*, prepared by the Weed Research Organization, has been taken over by CAB as from the 1962 Volume.

Recommendation (*90*). In view of this recommendation, it was not possible to follow up a suggestion from Professor M.B. Lal of the University of Lucknow for the holding of periodical conferences of Commonwealth helminthologists.

Recommendation (*96*). Plans were in hand for holding the Interim Conference in 1963.

Recommendation (*97*). The views of the Scientific Advisory Committee were ascertained, at their annual Conference with Council in November 1961, on certain questions that are to be referred to the special committee.

MEMBERSHIP OF THE EXECUTIVE COUNCIL

27. *Succession to the Chair.* An order of rotation for succession to the Chair had been agreed at the 161st Meeting on the 29th January, 1957; the roster approved at the time was to serve as a general guide, but it was recognized that circumstances might arise to justify its modification. With the advent of new Members, Council felt that the roster system should be reconsidered; the matter was, however, still pending at the end of the previous year.

At their 195th Meeting on the 3rd August, 1961, Council decided that the roster system should be continued: that two years' service as a Member of Council should be regarded as a minimum qualifying period for the Chairmanship, and one year's service as a minimum qualifying period for the Vice-Chairmanship. It was suggested, however, at the 197th Meeting on 6th December, 1961, that this system was not altogether satisfactory, that Council should revert to the elective system in force prior to 1957, and that the qualifying periods for the Chair should be curtailed.

The *pros* and *cons* of the roster and elective systems, and the length of the qualifying periods for the Chair, were considered at the 198th Meeting on the 24th January, 1962, when it was finally agreed that before a Member could be elected to the Chair he must have had at least one year's service in Council; the Chairmanship should be tenable for one year; a retiring Chairman should not be eligible for re-election until after the expiry of at least one year from the date of his retirement; the Vice-Chairmanship should be filled by election and should be tenable for a year; a retiring Vice-Chairman should not be eligible for re-election as Vice-Chairman until after the expiry of at least one year from the date of his retirement; a Vice-Chairman should be eligible for election as Chairman, but should not automatically succeed to the Chairmanship.

The elective system, thus approved for the Chairmanship and Vice-Chairmanship of the Executive Council, had already been accepted by Council for the Chairmanship of the Appointments Committee.

28. *Chairman and Vice-Chairman.* Dr. V. Armstrong, representing New Zealand, succeeded Mr. Kemal Reheem representing Pakistan, as Chairman at the 196th Council Meeting on the 26th October, 1961, and Mr. Alexander, representing the United Kingdom, succeeded Dr. Armstrong as Vice-Chairman.

29. *Members.* Mr. P. F. Butler succeeded Mr. E. J. Drake in September 1961 as Council Member for Australia.

30. Mr. A. Perera returned to Ceylon on the 6th October, 1961, and was succeeded by Mr. H. E. Seneviratne as Ceylon's representative on the Executive Council. Council recorded their appreciation of the services which Mr. Perera had rendered both as Member and as Chairman during the four years of his term of office in the Ceylon High Commission. It was Mr. Perera who gave the welcoming address at the opening of the CAB Review Conference, 1960.

31. Mr. J. A. Afari was appointed as Ghana's representative on the Executive Council in succession to Mr. W. W. K. Vanderpuye.

32. The Federation of Nigeria was represented on Council by Mr. P. Ogwuazor.

33. His Excellency Dr. W. H. Fitzjohn, High Commissioner for Sierra Leone, was appointed as his country's representative on Council.

LIAISON OFFICERS

34. Mr. W. Ness, C.B.E., retired from the service of the Agricultural Research Council at the end of October 1961, and his place as CAB Liaison Officer in the United Kingdom was taken by Dr. W. E. Berry from 1st November, 1961. Mr. Ness had served as Liaison Officer since 1st April, 1956, and had rendered valuable service to CAB, especially in regard to various staff and administrative problems.

35. Mr. Marris, Liaison Officer, New Zealand, as a result of a long illness, had been compelled to retire earlier in the year. Unhappily he died on the 4th November, 1961. He had been Liaison Officer for 13 years and his services will be sadly missed by his friends and colleagues. He has been succeeded by Mr. I. L. Baumgart.

36. Mr. G. R. Kamat, I.C.S., was appointed Special Secretary to the Government of India, Department of Agriculture, Ministry of Food & Agriculture, on 15th March, 1962, and succeeded Mr. V. Shankar, I.C.S., as CAB Liaison Officer in India at the end of the year.

37. The Director of Agricultural Research, Ibadan, and the Principal Agricultural Officer (Research), Njala, were appointed ex-officio Liaison Officers in Nigeria and Sierra Leone, respectively.

STAFF CHANGES

38. **Consultant Directors.** Professor B. G. Peters, M.Sc., Ph.D., Hon. A.R.C.S., Professor of Parasitology in the Department of Zoology and Applied Entomology, Imperial College of Science and Technology (University of London), was appointed Consultant Director to the Bureau of Helminthology.

39. **Directors.** Miss Sheila M. Willmott, Ph.D., who had been Acting Director, Bureau of Helminthology, since December, 1960, was appointed substantive Director on the 1st January, 1962.

40. **Assistant Directors.** Dr. G. C. Ainsworth was appointed Assistant Director, Mycological Institute, with effect from 1st April, 1961.

The quest for a suitable candidate to fill the post of Assistant Director, Bureau of Animal Breeding and Genetics, went on throughout the year; Mr. J. D. Turton was eventually appointed but did not take up his appointment until after the close of the year under review.

Dr. H. H. Williams was appointed Assistant Director, Bureau of Helminthology, and took up his duties soon after the year had ended.

41. **Scientific Assistants.** The title of "Scientific Assistant" was altered to "Scientific Information Officer".

42. **Obituary.** The deaths of Dr. Sheffield Neave, C.M.G., O.B.E., and Mr. J. S. Thomson, M.B.E., are noted with deep regret.

Dr. Neave died, at the age of 82, on the 31st December, 1961. He was Assistant Director, Institute of Entomology, from 1914 to 1942, and Director from 1942 to 1946, and was largely responsible for the development of the *Review of Applied Entomology* as it is today.

Mr. J. S. Thomson, who retired as Assistant Director, Bureau of Animal Nutrition, on 28th October, 1956, died on 10th February, 1962. He had served also as Secretary, *Nutrition Abstracts and Reviews.*

VISITS OVERSEAS

43. Mr. C. Kemal Reheem, Chairman, Executive Council, attended the bi-centenary celebrations of the Academie d'Agriculture de France during June 1961.

44. The Secretary, Sir Thomas Scrivenor, with Dr. Simmonds, the Director of C.I.B.C., visited the European Station of the Institute of Biological Control at Delémont in Switzerland, and the FAO Headquarters at Rome, between the 17th and 24th October, 1961.

45. Mr. E. O. Pearson, Director, Institute of Entomology, and Dr. J. C. F. Hopkins, Director, Mycological Institute, visited the Northern, Western and Eastern Regions of Nigeria, and Ghana, in October-November, 1961. During the tour talks were arranged with Ministers and senior scientific and administrative officers. Dr. Hopkins also inspected a new state farm project in Ghana, at Akatsi, to advise on the control of tobacco diseases, and visited Keta to advise on the Cape St. Paul disease of coconuts.

46. Mr. R. W. Crosskey visited the European Station of the Institute of Biological Control in December 1961 in connexion with work on the taxonomy of the Tachinidae.

47. Arrangements were made for Dr. C. Booth of the Mycological Institute to spend three months from April 1962, in the laboratory of Dr. W. L. Gordon in Winnipeg, Canada, to study his techniques for the cultivation and identification of the genus *Fusarium.*

48. Mr. F. C. Deighton, in July 1961, visited mycological herbaria in Vienna, Neuchatel and Geneva, to examine *Cercospora* and other genera of particular interest to the Institute and to have consultations with Dr. F. Petrak.

49. Dr. F. J. Simmonds, Director, Institute of Biological Control, visited Hawaii, Japan (on Canadian work), Taiwan, Hong Kong, Brunei, North Borneo (with one day in southern Malaya on a special project), India, Pakistan, Switzerland (to visit the Institute's Stations), Rome (Food and Agriculture Organization), Geneva (World Health Organization), the United Kingdom and the Bahamas. In connexion with projects, Dr. Lloyd spent some time in Chile, Uruguay and Argentina. Dr. Bennett visited Antigua, Barbados, Brazil, British Guiana, Grenada and St. Vincent. Dr. Ghani spent two months in Indonesia and also visited Malaya and the Indian Station en route. Dr. Rao spent some three months in Hong Kong and Malaya and visited the Philippines, Cambodia, Thailand and Ceylon en route. He also visited the Pakistan Station. Dr. Pschorn-Walcher spent nearly six months in Japan, visiting the Indian and

Pakistan Stations en route, and, on his return, the Californian Station and various Institutes in Canada (at the request of the Canadian Government). Officers of the European Station covered a wide area of Europe during the course of their work.

50. On 24th February, 1962, Mr. J. P. Maule, Director, Bureau of Animal Breeding and Genetics, proceeded on a six week tour of the three High Commission Territories (Basutoland, Swaziland and Bechuanaland) and the Federation of Rhodesia and Nyasaland.

51. Mr. E. J. Mann, Director, Bureau of Dairy Science and Technology, made a tour of Canada and the United States during May and June, 1961.

52. Mr. A. G. G. Hill, Director, Bureau of Pastures and Field Crops, visited parts of Northern France from 22nd–28th May, with a small party organized by the British Grassland Society, to study current grassland research and development there.

ATTENDANCES AT CONFERENCES AND COMMITTEES

53. The Secretary, Sir Thomas Scrivenor, attended a Technical Conference of Directors and Senior Officers of Overseas Departments of Agriculture and Agricultural Institutions at Wye College on the 8th September, 1961, and gave an address on the functions and policy of the CAB organization. Later, in the same month, he attended the 27th conference of the International Federation of Documentation at the Caxton Hall, Westminster, while the Assistant Secretary, Mr. E. L. Hay, attended the International Cocoa Conference.

54. Mr. E. O. Pearson, Director, Institute of Entomology, and Dr. J. C. F. Hopkins, Director, Mycological Institute, attended the Sixth Annual Meeting of the Inter-African Phytosanitary Commission, held at Ibadan, Nigeria, from 16th to 20th October, 1961.

55. Mr. Pearson continued to serve as a member of the Committee for Colonial Agricultural, Animal Health and Forestry Research (now disbanded), the Colonial Pesticides Research Committee, the British Standards Institution Technical Committee on the Nomenclature of Insecticides, the Advisory Committee on Anti-Locust Research, the Scientific Advisory Committee of the Empire Cotton Growing Corporation and the Advisory Committee on Agriculture in the Sudan; Mr. Pearson and Dr. Hopkins have accepted invitations to join the Advisory Panel set up by the Agricultural Adviser to the Secretary for Technical Co-operation.

56. Mr. G. J. Kerrich continued to serve as Honorary Treasurer of the Systematics Association, and as a member of the Council of the British Trust for Entomology. Mr. D. Macfarlane served as Honorary Secretary of the Roy Society. Mr. G. E. J. Nixon served on the Publication Committee of the Royal Entomological Society of London. Mr. W. H. Potts continued to serve as a member of the Tsetse Fly and Trypanosomiasis Committee, and as Honorary Editor of the Royal Entomological Society of London.

57. Arrangements were made for the annual meeting of medical and veterinary mycologists, held under the auspices of the Medical Research Council, to visit the Mycological Institute in April of the coming year to inspect the work in progress and to view demonstrations. Dr. Hopkins continued to serve on the Colonial Agricultural and Forestry

Research Committee, the Colonial Pesticides Research Committee, British Standards Pesticide Committee and the Medical Mycology Committee of the Medical Research Council. Dr. G. C. Ainsworth, Assistant Director, Mycological Institute, acted as co-editor of the 12th Symposium (on Microbial Classification) of the Society of General Microbiology to which he contributed a paper.

58. Mr. J. P. Maule, Director, Bureau of Animal Breeding and Genetics, attended the 8th International Congress of Animal Production held in Hamburg from 12th to 16th June, 1961. He also gave a paper at the Technical Conference of Directors and Senior Officers of Overseas Departments of Agriculture and Agricultural Institutions at Wye College on 9th September, 1961, and attended the 35th Meeting of the British Society of Animal Production at the West Riding Institute of Agriculture, Askham Bryan, Yorkshire, from 11th to 15th September, 1961.

59. Mr. M. Crawford, Director, Bureau of Animal Health, attended the 9th Medical and Veterinary Mycopathology Meeting at Belfast on the 23rd and 24th March, 1961; the symposium on Animal Health and Production, at Bristol from the 10th to the 13th April, 1961; and the British Veterinary Association Annual Congress at Oxford from the 3rd to the 8th September, 1961. His Assistant Director, Mr. R. Mack, attended the British Small Animal Veterinary Association 4th Annual Congress in London, 20th–23rd April, 1961. Mr. Mack and Mr. Gotts acted as interpreters at the 7th International Congress of Biological Standardization.

60. The Bureau of Animal Nutrition was represented at three International Congresses held in 1961. The organizers of the 4th International Congress on Animal Reproduction and of the 8th International Congress of Animal Production had recognized the extent to which their programmes might overlap. The result was that the one was held at the Hague from the 5th to 9th June and the other followed immediately at Hamburg from the 12th to the 16th June: Mr. Bell attended at both. In London the 3rd International Congress of Dietetics took place from the 10th to 14th July with Lord Boyd Orr, one of the Consulting Editors of *Nutrition Abstracts and Reviews*, as Honorary President; Miss Deans was the Bureau's representative.

61. Mr. E. J. Mann, Director, Bureau of Dairy Science and Technology, continued to serve as a member of a Committee of the International Dairy Federation dealing with dairy terminology. Meetings of the Committee took place in Offenburg, Luxemburg, Brussels and London during the year. Mr. Mann attended the Annual Meeting of the American Dairy Science Association in Madison, Wisconsin, USA, in June 1961.

62. Mr. Ford Robertson, Director, Forestry Bureau, attended the Standing Committee on British Commonwealth Forestry; the Joint FAO/IUFRO Committee on Bibliography in Vienna; the 13th IUFRO Congress in Vienna; and the Planning/Executive Committee and The Governing Council of the Commonwealth Forestry Association.

63. Mr. G. E. Tidbury, Assistant Director, Bureau of Horticulture and Plantation Crops, attended an International Cocoa Conference organized by the Cocoa, Chocolate and Confectionery Alliance in London from the 12th to the 14th September, 1961.

64. Dr. P. S. Hudson, Director, Bureau of Plant Breeding and Genetics, represented CAB at the FAO Technical Meeting on Plant Exploration and Introduction in

Rome from the 10th to the 20th July, 1961. Mr. G. V. Jacks, Director, Bureau of Soils, continued to serve as a member of the Nature Conservancy and the Advisory Committee on Forest Research, and represented CAB on the Documentation Standards Committee OC/20 of the British Standards Institution.

VISITS TO INSTITUTES AND BUREAUX BY OVERSEAS SCIENTISTS

65. The Review Conference, 1960, recommended that when visiting scientists from Commonwealth countries wish to work temporarily at the Institutes or Bureaux, Directors should, when feasible, provide accommodation and guidance as at present. Such facilities have continued to be provided, but CAB now hope to do more.

66. **Opportunities for training and study.** It is hoped that it may be possible to make arrangements for selected scientists in Government or quasi-Government employment to be seconded to Institutes and Bureaux, where accommodation is available, (i) to gain at least a year's post-graduate experience in abstracting scientific literature, or (ii) to be given library facilities and guidance, for periods not exceeding a year, to study in detail and to write up in the form of a Technical Communication a subject of particular interest to themselves and their Governments. Assistance towards passages and also perhaps subsistence allowances in the United Kingdom might be forthcoming through the Department of Technical Co-operation as part of that Department's technical aid programme for developing countries.

This is not a training scheme, but an arrangement whereby suitable qualified scientists in the employment of contributing Governments can gain further experience. CAB have no funds, staff or facilities to embark on schemes of systematic training which can be provided more effectively by institutions equipped to give it.

CAB have nevertheless endeavoured to keep Commonwealth Governments aware of any training facilities open to them where the need for training has been established and brought to CAB's notice, as in the case of Resolution 5 of the Sixth Commonwealth Mycological Conference. The Conference was of the opinion that greater facilities should be provided for the training of specialists in nematology and also that some course work on nematology should be included in the training of every plant pathologist. Inquiries having elicited the information that outside the United Kingdom no adequate facilities existed in the Commonwealth at present, Liaison Officers were informed of the facilities available at the Imperial College of Science and Technology in London and of the advanced course in nematology contemplated at the University College, Dublin.

On a suggestion made by the Liaison Officer, Pakistan, the Department of Technical Co-operation have agreed to fill one of the existing vacancies in the Pool of Plant Pathologists by the appointment of a nematologist who would be based on the Bureau of Helminthology.

67. A documentation course was held at the Forestry Bureau in December 1961, and included practically all graduates attending the Commonwealth Forestry Institute. They came from British Guiana, Burma, Ceylon, Ghana, India, Israel, Kenya, North Borneo, Northern Rhodesia, Pakistan and Trinidad. The Consultant Director kindly lent the Institute Committee Room so that a single large class could be accommodated.

68. **Distinguished Visitors.** Mr. C. N. Harvey, of the Agricultural Research Council, who is concerned with the production of a series of bibliographies on farm building

research, made two visits to the Bureau of Animal Health to consult literature which had been indexed in *Index Veterinarius* but which was not readily available to him in other libraries.

69. Professor P. C. Mangelsdorf and Mrs. Mangelsdorf of Harvard University arrived at the School of Agriculture, Cambridge, in Jan. 1962. Prof. Mangelsdorf is one of the foremost world authorities on the origin of maize and other cultivated plants and is writing a book on the subject. For this purpose he and Mrs. Mangelsdorf chose to spend six months at Cambridge to avail themselves of the facilities of the library and the Bureau of Plant Breeding and Genetics. They are making extensive use of *Plant Breeding Abstracts*, of the punched-card inquiry service and of the Bureau literature collection.

70. Dr. P. Wrinch, also of Harvard University, spent several periods varying from odd days to a week at the Bureau of Plant Breeding and Genetics in the summer of 1961 making use of the Bureau collection of work on Russian genetics, which she said she found unique; having been unable to find most of the works she required in the USA, she made arrangements for a large number of them to be microfilmed and sent to her, on payment, in the USA. Similar arrangements were made for Dr. P. C. Misic from Yugoslavia for a large number of works on fruit-tree breeding and genetics.

71. The President of Finland, accompanied by his wife, visited the Commonwealth Forestry Institute and the Forestry Bureau at Oxford. Other distinguished visitors to the Institutes and Bureaux included:
Prof. Morales Avila, University San Andrea, La Paz, Bolivia; Dr. S. N. Banerjee, India; Prof. I. L. Campbell, New Zealand; Mr. J. Alex. Campbell, Food and Drug Laboratory, Ottawa; Mr. Donn Casey, Australia; Rajah Sir Muthiah Chettiar of Chettinad, India; Dr. Ross Cockrill, FAO, Rome; Dr. N. R. Dhar, India; Dr. C. M. Driver, Crop Research Division, P.B., Christchurch, New Zealand; Mr. H. Ferguson, Chief of Agricultural Research Division, Ministry of Agriculture, Republic of the Sudan; Dr. H. E. Fernando, Chief Entomologist, Department of Agriculture, Ceylon; Prof. Fromer, Forest Department, Warsaw, Poland; Dr. K. A. Gavrilov, USSR; Dr. Sayed Wadie Habashi, Director of Agriculture, Republic of the Sudan; Dr. C. J. Hackett, Senior Medical Officer, WHO; Prof. Yoshio Hashioka, Japan; Dr. G. A. Herklots, Nepal; Dr. K. K. Iya, Director of the National Dairy Research Institute, India; Dr. C. Kempanna, Botany Division, Agricultural College, Bangalore, India; Mr. A. R. A. Kheir-Eldin, Chief of Scientific Council, United Arab Rebublic; Mr. J. MacKinnon, Director of Veterinary Services, S. Rhodesia; Prof. Mine, University of Tokyo, Japan; Dr. A. R. Mohajir, Pakistan National Scientific Documentation Centre PANSDOC, Karachi, Pakistan; Dr. M. Odriozola, Spain; Mr. J. C. Raath, Ministry of Agriculture, Federation of Rhodesia and Nyasaland; Dr. M. V. Spooner, Minister, Department of Lands & Forests, Toronto, Canada; Dr. M. S. Swaminathan, Indian Agricultural Research Institute, New Delhi, India; Dr. & Mrs. Theodor Von Brand, USA; Dr. J. M. Waterston, Director of Federal Agricultural Research, Nigeria.

PUBLICATIONS

72. The receipts from sales of publications have always been collected separately by the Institutes for their respective publications, and by the Bureau of Animal Nutrition for

the journal *Nutrition Abstracts and Reviews*. Central Sales deals with the sales of publications for headquarters, for all the other bureaux and for the Occasional Publications of the Bureau of Animal Nutrition. The four sets of receipts have always been shown separately in annual reports. From paragraph 73 it will be seen that total receipts from sales of publications for 1961/62 amounted to £115,210 as against the figure of £93,437 for 1960/61.

73. Receipts from sales of publications over the last seven years have been as follows:

	1955–56 £	1956–57 £	1957–58 £	1958–59 £	1959–60 £	1960–61 £	1961–62 £
Commonwealth Institute of Entomology	11,433	15,582	14,144	14,630	14,801	16,489	18,468
Commonwealth Mycological Institute	6,820	9,438	10,781	11,471	11,770	11,655	14,856
Nutrition Abstracts and Reviews	8,428	9,928	9,582	11,856	11,967	12,130	13,976
The Bureaux	31,041	40,868	45,018	47,005	50,967	53,163	67,910
TOTAL	57,722	75,816	79,525	84,962	89,505	93,437	115,210

NOTE: The prices of journals were raised for the 1957 volumes and for the 1962 volumes.

During the year the Executive Council, acting on a recommendation of the CAB Review Conference, 1960, increased the prices of CAB journals to a more realistic level. The average increase was 50%; but at the same time the Executive Council fixed special reduced rates for Government Departments of contributing countries and state-aided research institutions in contributing countries.

74. Expenditure on production of publications (excluding those of the Institute of Biological Control) amounted to £68,919 during the year as against £71,917 for the preceding year. Cash collected during the year was £115,210 thus giving a surplus of £46,291 of revenue over expenditure. Receipts from sales of publications increased by £21,773 or 23% and this increase resulted from an increase in the number of subscriptions, increases in the prices of journals and a continuing demand for the back volumes of the journals.

75. The sales analysis, that is the analysis of the actual invoices sent out during the year is shown in the first table overleaf. For comparison, figures are given for several years. Only the publications dealt with by Central Sales have been shown in this way and earlier figures are intended to show the general trend.

It will be noted in the following table that the figure for the publications of the Bureau of Helminthology for 1961/62 shows an increase of only £39 over that of the previous year and that the figures for all other bureaux show much larger increases. Subscriptions to the current volumes of *Helminthological Abstracts* increased by over £500 but this gain was largely offset by a drop of £450 in the sales of back volumes of the journals, which reached an abnormally high peak of £1,500 during 1960/61.

76. The sales analysis table overleaf takes no account of copies distributed under the quota system or free. Under the quota system copies of the 1961 volumes of the journals

to the value of £8,995 were sent to countries of the Commonwealth and other contributing countries. In addition, journals to the value of £1,675 were sent free and as exchange to Commonwealth countries and to the value of £3,151 to foreign countries.

	1955–56	1956–57	1957–58	1958–59	1959–60	1960–61	1961–62
	£	£	£	£	£	£	£
Animal Breeding and Genetics	2,625	3,145	3,706	4,795	4,551	4,490	5,451
Animal Health	5,781	6,963	8,108	8,126	9,159	8,830	12,159
Animal Nutrition	41	628	513	288	436	396	559
Dairy Science and Technology	2,727	5,107	3,972	5,431	5,938	5,647	6,824
Forestry	3,274	5,180	5,087	5,913	5,667	6,362	8,073
Helminthology	1,866	2,266	3,174	2,765	4,491	3,940	3,979
Horticulture and Plantation Crops	3,541	4,686	5,036	5,138	5,357	5,527	7,321
Pastures and Field Crops	3,916	4,787	4,830	4,573	5,158	4,905	7,414
Plant Breeding and Genetics	3,718	4,320	4,242	4,224	5,378	5,151	7,096
Soils	4,005	4,683	5,468	5,183	6,099	6,394	9,094
Headquarters	88	329	258	115	276	266	213
Weed Abstracts	—	—	—	—	—	—	1,463
TOTAL	31,582	42,094	44,394	46,551	52,510	51,908	69,646

The total value of copies distributed under the quota, free and exchange was £13,821.

Corresponding figures for 1960 were quota £9,022, free and exchange to Commonwealth countries, £1,403 and to foreign countries £3,212, total value £13,637.

In paragraph 74 it is said that receipts from sales during the year showed an excess over the direct costs of printing, distribution and paper, but if the very great value of these various free copies is added to the receipts the total comes to far more than the direct cost of production.

77. A further 104 volumes of *Agricultural & Horticultural Engineering Abstracts*, 159 copies of *World Agricultural Economics and Rural Sociology Abstracts* and 158 copies of *Apicultural Abstracts* were distributed under the quota system by arrangement with the publishers. In addition, under an agreement between the Executive Council and the Agricultural Research Council, *Weed Abstracts* will be published and distributed by the Commonwealth Agricultural Bureaux as from Volume 11 (1962); but the Weed Research Organization will continue to prepare the material for the journal. The first quota copies of this journal were distributed during January.

78. The numbers on the mailing lists for the 1961 volumes of all journals were as follows:

	Volumes supplied under quota system	Other Volumes supplied free	Subscriptions	Total
British Commonwealth, the Republic of the Sudan and the Republic of Ireland	2,725	484	7,213	10,422
Other countries	—	941	12,464	13,405
TOTAL	2,725	1,425	19,677	23,827

79. The subscriptions to the main journals increased in number during the year from 18,137 to 18,701. This is analysed in the following table:

Journal	1960	1961	Increase or Decrease Actual	Percentage
Bulletin of Entomological Research	990	979	−11	−1·1
Review of Applied Entomology Series A	1,359	1,386	+27	+2·0
Series B	1,060	1,025	−35	−3·3
Review of Applied Mycology	1,535	1,551	+16	+1·0
Nutrition Abstracts and Reviews	1,833	1,927	+94	+5·1
Animal Breeding Abstracts	1,065	1,131	+66	+6·2
Veterinary Bulletin	1,335	1,382	+47	+3·5
Dairy Science Abstracts	1,849	1,909	+60	+3·2
Forestry Abstracts	1,047	999	−48	−4·6
Helminthological Abstracts	731	778	+47	+6·4
Horticultural Abstracts	1,286	1,358	+72	+5·6
Herbage Abstracts	869	909	+40	+4·6
Field Crop Abstracts	760	815	+55	+7·2
Plant Breeding Abstracts	1,107	1,157	+50	+4·5
Soils and Fertilizers	1,311	1,395	+84	+6·4
TOTALS	18,137	18,701	+564	+3·1

Full details of distribution for quota, free, exchange and subscription copies are given in the table on page 80.

80. Action taken to increase the sales of journals and occasional publications was as follows:

(i) Central Sales now distribute twice a year a Publications List of the Commonwealth Agricultural Bureaux to selected addresses. Some 5,000 of the June 1961 list were despatched and 11,000 of the October 1961 list. Of these 5,000 copies of the October 1961 issue were sent to specialized addresses in the USA supplied by the Educational Directory, Chicago, Illinois. Leaflets describing new Occasional Publications and cyclostyled forms showing recent publications were inserted in the journals in considerable numbers. Interested people were given specimen copies of journals and, in some cases, extra copies of certain parts of journals were printed to be circulated to potential purchasers.

(ii) Publications were shown in book Exhibitions organized by scientific organizations or associations of booksellers. During the year CAB publications were displayed at book exhibitions in Tokyo, Hamburg, The Hague, Blindern (Norway) and Rome.

(iii) CAB publications were also brought to the notice of scientists and the public generally by advertisements either paid for or exchanged with other scientific journals.

(iv) The annual report is sold and is also widely distributed free, thus permitting many persons to acquaint themselves with the work of CAB if they so desire.

81. During 1961 the following volumes of the *Bulletin of Entomological Research* and the fourteen abstract journals were issued:

Bulletin of Entomological Research, Vol. 52
Review of Applied Entomology, Series A, Vol. 49
Review of Applied Entomology, Series B. Vol. 49
Review of Applied Mycology, Vol. 40
Nutrition Abstracts and Reviews, Vol. 31
Animal Breeding Abstracts, Vol. 29
Veterinary Bulletin, Vol. 31
Dairy Science Abstracts, Vol. 23
Forestry Abstracts, Vol. 22
Helminthological Abstracts, Vol. 30
Horticultural Abstracts, Vol. 31
Herbage Abstracts, Vol. 31
Field Crop Abstracts, Vol. 14
Plant Breeding Abstracts, Vol. 31
Soils and Fertilizers, Vol. 24

The publication year of all the above journals is the calendar year and the first part or parts of the 1962 volumes were issued by the 31st March, 1962, the end of the year under review.

82. Other periodical publications issued during the year were:

Distribution Maps of Pests, Nos. 121–138	*Entomology*
Zoological Record—Part Insecta. Vol. 96	*Entomology*
Distribution Maps of Plant Diseases Nos. 380–390	*Mycology*
Commonwealth Phytopathological News, Vol. 7, Parts 2–4 and Vol. 8, Part 1	*Mycology*
Bibliography of Systematic Mycology, 1961 and 1962 (1st Part)	*Mycology*
Review of Medical and Veterinary Mycology Vol. 4, Parts 2–5	*Mycology*
Index of Fungi, Vol. 3, Parts 2 and 3	*Mycology*
Catalogue of the Culture Collection, (3rd Edition), Supplements 2 and 3	*Mycology*
Index Veterinarius, Vol. 28 (1960), Parts 3 and 4, Vol. 29 (1961), Parts 1 and 2	*Animal Health*
Veterinary Reviews and Annotations, Vol. 7	*Animal Health*

As from 31st December, 1961, *Veterinary Reviews and Annotations* ceased publication as a separate journal. Review articles of the same type as those previously published in *Veterinary Reviews and Annotations* are now included in the *Veterinary Bulletin*.

83. The following occasional publications were issued during the year:

Report on the Sixth Commonwealth Mycological Conference, 1960	*Mycology*
Mycological Papers, Nos. 80–83	*Mycology*
Technical Bulletin, No. 1	*Biological Control*

The Nutrition of the Young Pig: a Review, by I. A. M. Lucas and G. A. Lodge	*Animal Nutrition*
Research Techniques in use at the Grassland Research Institute, Hurley	*Pastures and Field Crops*
A Bibliography of Subterranean Clover together with a descriptive introduction by D. E. Symon	*Pastures and Field Crops*
The Trace-element Content of Fertilizers, by D. J. Swaine	*Soils*

84. *Reprinting Unit.* This unit was established at Farnham House during 1957, reference paragraph 21 of the 29th Annual Report. The unit uses Xerography (an electrical reproduction process for making paper and metal offset duplicating masters) and offset litho equipment. During the year *Veterinary Reviews and Annotations*, Volume 7, occasional publications and reports and papers totalling 1,726 pages were printed from typescript prepared by Head Office, the Institutes and Bureaux. In addition, approximately 8,568 pages of back volumes of journals and occasional publications were reprinted.

DIRECTORS' SUMMARIES OF THEIR ANNUAL REPORTS FOR 1961/1962

Commonwealth Institute of Entomology

85. We have to record, with great regret, the death of Dr. Sheffield A. Neave, C.M.G., O.B.E., on the 31st December, 1961. Dr. Neave was Assistant Director of this Institute from 1914 to 1942, and Director from 1942 to 1946. He was largely responsible for the development of the *Review of Applied Entomology*, and the aims that he set and the characteristics that he then established have remained a guide to his colleagues and successors over the past fifty years.

86. *Staff.* There were no changes during the year in the staff of full-time taxonomic specialists, but one post was left unfilled. Amongst the editorial and abstracting staff, one post and one vacancy, caused by the death of Mrs. F. Sprague, who had been a much-valued member of the staff for 20 years, were not filled, nor were two junior posts. The decision to keep staff numbers below strength has been necessitated by the financial stringency that developed in the last year of the quinquennium. Mr. R. Elliott, formerly entomologist with the Nigerian Medical Service, was appointed in November, thus implementing the 1960 Review Conference recommendation for the immediate appointment of an abstractor with scientific training, but left at the end of March to take up an appointment in New Zealand. Dr. W. J. Hall relinquished his part-time appointment at the end of 1961 (but, it is hoped, will continue his taxonomic studies of the Coccoidea) and Capt. H. S. Bushell did likewise in January 1962, after having completed his task of bringing the *Review* indexes up to date and training a successor.

87. *Overseas Visits.* The Director attended the Sixth Annual Meeting of the Inter-African Phytosanitary Commission, held at Ibadan, Nigeria, from 16th to 20th October, 1961. The opportunity was taken to visit the three Regions of Nigeria and Ghana, in order to see entomological research work in progress and advise the Governments of the respective territories.

Mr. R. W. Crosskey paid a short visit to the European Station of the Commonwealth Institute of Biological Control to discuss problems of the taxonomy of the Tachinidae with Dr. L. P. Mesnil.

88. *Visiting Workers.* Arrangements were made for the following overseas scientists to spend short periods working in the Institute library or (by arrangement with the Museum authorities) at the British Museum (Natural History): Dr. A. S. K. Ghouri (Pakistan), for work on the taxonomy of Acridoidea; Dr. J. P. Glasgow, in connection with his report and recommendations on tsetse research in the Federation of Rhodesia and Nyasaland; Mr. R. W. Paine (Fiji) in connection with work on parasites of the banana scab moth, *Nacoleia octasema* Meyr., in the Indonesia–Australasian region; and Dr. D. Schröder (Commonwealth Institute of Biological Control, Switzerland), while preparing the supplement to the *Catalogue of Parasites and Predators.*

89. *Identification Service.* The approximate number of specimens received for identification was 51,000 (47,000 in 1960/61). They arrived in 623 (553) consignments, sent by 241 (272) correspondents representing the following regions: Africa, 77; America, 23; Asia, 66; Australasia and Oceania, 27; and Europe, 48. The lists of identifications sent out numbered 458 (446) and comprised 9,018 (9,161) names; the total of species identified included 3,114 from Africa, 589 from America, 3,360 from Asia, 1,412 from Australasia and Oceania and 543 from Europe, and, as usual, the territories from which the material was obtained included almost all member countries of the Commonwealth. Apart from named specimens returned to the senders, 11,500 (5,610) specimens were presented to the British Museum (Natural History), and among these were the types of 36 (47) new species and examples of a further 178 (173) species not previously represented in the National Collection.

The pronounced upward trend in the number of identifications made on behalf of correspondents in Asia during the past three years has been maintained, and the value for the present year is some two and a half times that of 1958/59. This increase is attributable in large measure to the entomological surveys being conducted by the Indian and Pakistan stations of the Commonwealth Institute of Biological Control.

In an attempt to reduce the avoidable delay in identification resulting from the indifferent condition in which specimens too often arrive, short leaflets on appropriate methods of preserving and packing insects have been prepared for distribution to sources where they are likely to be of benefit.

90. Twenty-four papers or monographs, presenting the results of taxonomic and ecological studies, and written by members of staff, sometimes in co-authorship with other specialists, were published during the year and in all comprised 660 printed pages. The longer contributions included the first volume of a series on the terrestrial Acari of the British Isles (valuable as a general introduction to the study of ticks and mites) of which Mr. D. MacFarlane was a co-author (219 pp.), and an account of the morphology and taxonomy of male scale insects, by Dr. M. S. K. Ghauri (221 pp.). Some of the shortest were written in order to furnish scientific names as quickly as possible for insects of economic importance that had been sent in for identification and had proved to represent previously undescribed species.

91. *The Review of Applied Entomology*, Series A & B, Vol. 49 (1961) totalled 978 pages

(exclusive of indexes) and contained 2,768 abstracts and titles, the corresponding figures for 1960 being 798 and 1,840. The increase in size (22·5%) and in the number of abstracts (50·5%) continue to reflect the measures being taken to reduce the arrears of papers awaiting abstract and to increase coverage. The two series together represent the largest ever produced. Indexing has continued to make progress; during the year the index to Vol. 47 (1959) Series A (115 pp.) appeared in April, to Vol. 48 (1960) Series B (51 pp.) in May and Series A (131 pp.) in December. The index to Vol. 49 (1961) Series B (63 pp.) was issued with the March 1962 part and the corresponding one for Series A is well advanced. The prolonged effort to overtake arrears of indexing has thus been successfully concluded.

92. *The Bulletin of Entomological Research* Vol. 52 (1961) totalled 814 pages of text and 9 plates, and contained 55 papers contributed by authors representing 17 countries. The four quarterly parts were issued in April, June, October and December, 1961. The index (7 pages) has been simplified and shortened, and will be issued with Part 1 of the 1962 volume. The index to Vol. 51 was issued in April 1961.

93. *Distribution Maps of Pests* were increased from 12 to 18 a year, Nos. 121–129 being issued in June and Nos. 130–138 in December. An index to Maps 1–129 was issued in June.

94. *The Zoological Record* part *Insecta* Vol. 96 (literature of 1959) was issued in July 1961. A new format has been adopted, in common with the other parts of the *Record*, using a larger size of page in order to reduce the excessive bulk of the bound volume; the number of pages was thus reduced to 384 (650 in 1960) although the number of papers recorded (4,462) was only a little less (4,521 in 1960).

95. *Sales of Publications.* The overall number of subscribers to publications of the Institute showed little change, the figures for 1961 (with those for the previous year in brackets) being: *Review of Applied Entomology* Series A, 1,386 (1,359); Series B, 1,025 (1,060); *Bulletin of Entomological Research*, 979 (990); *Distribution Maps of Pests*, 339 (338). In addition, 742 (515) copies of occasional Publications were sold. The net cash receipts during the financial year 1961/62 for all publications was £18,467, an increase of nearly £2,000 over 1960/61, which was itself a record. The greater part of this increase is due to the increased rates of subscription for the 1962 volumes of the journals: it is too early to know whether these increases are having an adverse effect on subscriptions.

96. *Library.* Accessions during the year numbered 219 bound volumes and 799 separates, making a total of 14,835 bound volumes and 50,966 separates now in the library. Parts of 701 serial publications were received, of which 440 were from non-Commonwealth sources.

The author catalogue is complete for monographs and separates. The entomological contents of 83 volumes were catalogued during the year, 69·6% of the library stock of bound volumes now being catalogued on cards by authors. The subject index to monographs, comprising about 2,430 cards, and the sheaf catalogue of official and serial publications are both up to date.

The library was in daily use by staff and visitors and the number of loans reached 1,820, the highest figure since 1953/1954. During the year a new system of recording

loans was adopted; instead of entering each item in a loan book and on a loan slip, items are now recorded on a loan voucher in triplicate. This makes it easy to see at a glance when and by whom publications have been borrowed and it also simplifies the checking of overdue loans.

Subject and bibliographical inquiries from government departments, universities, research stations and commercial organizations, as well as from individual readers, were received and dealt with during the year. Microfilms and photocopies were obtained of 67 articles and extracts, for correspondents in 7 Commonwealth and 7 foreign countries.

Surplus publications were distributed to the Bureaux and other institutions, and as always, grateful thanks are due to those individuals and organizations who kindly donated publications to the library: these include Dr. W. J. Hall, who generously presented a most valuable personal collection of books and reprints on the Coccoidea.

97. *Information Service.* There has been a steady demand for biological or bibliographical references concerning species submitted for identification, a substantial proportion of which has come from correspondents in the Indian sub-continent. These requests were not always concerned with economic aspects of entomology: a number were from students working on entomological projects for University degrees.

Topics on which summaries of information or bibliographies were sought included hazards in the use of certain organophosphorus insecticides, reflecting and fluorescent paints for marking insects, the biology and control of leaf-cutting ants, and methods of disinfesting dried fish; two of the less common were the arthropod parasites of camels and the occurrence of Coprid beetles in children.

Requests for help in checking or compiling faunal lists, or lists of agricultural pests, have come from several sources, including Ghana, Iraq and Mauritius. In some instances it was possible to indicate to compilers how such lists could be made more valuable by the inclusion of additional data, accessible to them directly or through publications issued by the Institute. In addition, the names of predacious Coleoptera have been checked for the parasite-predator catalogue being prepared by the Commonwealth Institute of Biological Control.

98. *Pool of Entomologists.* Responsibility for the Pool of Entomologists was transferred from the Colonial Office to the Department of Technical Co-operation. Mr. E. S. Brown's assignment for work on soun pest (*Eurygaster integriceps*) under the Central Treaty Organization, was extended to the end of 1961 so that he could finish preparing his results for publication. This work has been done at the Institute. His final report was submitted in December 1961; it contains his main findings and recommendations, notably as regards the possibility of forecasting outbreaks of this important pest of wheat, and is to be published. A very large amount of important entomological information, though not all of economic significance has emerged from this assignment, and is contained in ten papers, of which one has already appeared, one is in preparation and the remainder have been submitted for publication. Since 1st January, 1962, Mr. Brown has been engaged on preparing a critical review of the literature on army worms (particularly *Spodoptera exempta* (Wlk.)) in connection with a probable assignment to East Africa to investigate their periodical outbreaks.

Mr. C. R. Wallace has continued in his assignment to Sarawak, on secondment to the Department of Agriculture for the purpose of building up an entomology division, including the training of assistant staff, and surveying the present and potential insect and mite pests of agricultural importance. Extensive field inspection and collecting, supplemented by routing trapping, has yielded large quantities of material which is at present in course of identification at the Institute; of the 350 species so far named, 80 are potentially of agricultural importance, although by no means all of these are so at present. A feature of the field work on which Mr. Wallace comments is the intensity of the activity shown by predators and parasites.

Dr. I. W. B. Nye's final report on the campaign to control *Melittomma insulare* on coconuts in the Seychelles (which continues to make satisfactory progress) was issued in mimeographed form (12 pp.) by the Colonial Office in March 1961; a formal paper describing the work was also published (*Bull. ent. Res. 52* 489–499). Dr. Nye has been attached to the Institute for the whole year, and has completed revisionary papers on two genera of Pyralid moths of economic importance (*Prophantis* Warr. and *Marasmia* Led.) and embarked upon a longer-term revisionary project on the *Schoenobius—Scirpophaga* complex, which includes many important Asiatic pests of rice. Dr. Nye has now resigned from the Pool in order to take up an appointment on the staff of the British Museum (Natural History), in which it is expected that he will be able to continue this revisionary work.

99. *Termite Research Unit.* Two members of the Termite Research Unit, which now comes under the Department of Technical Co-operation, Mr. W. V. Harris, Officer-in-Charge, and Mr. W. A. Sands, were attached to the Institute throughout the year.

100. Eighty-five species of termites were named from 175 tubes of specimens submitted during the year. These originated in Bahrein, British Guiana, Borneo, Burma, Cyprus, Egypt, Ethiopia, Grenada, Java, Kenya, Malaya, Nigeria, Northern Rhodesia, Sarawak, Sierra Leone, South Africa, St. Helena, Sudan, Sumatra, Tanganyika, Uganda and West New Guinea.

101. Living termites as a source of class material were supplied to seven University and Technical College zoology departments. Tests for termite resistance were carried out on three plastic materials. The small stock of living termites was maintained.

102. Mr. Harris attended the Congress of the International Union for the Study of Social Insects (IUSSI) at Pavia in September, contributing a paper on the taxonomy of the phytophagous Isoptera. He took part in a meeting of Forest Officers at Oxford on the invitation of the Forestry Adviser to the Department of Technical Co-operation. He lectured to the students in the tropical department of the Architectural Associates School of Architects. In addition to being the chairman of the British Section of IUSSI and Treasurer of Institute of Biology, Mr. Harris has become Treasurer of the International Congress of Entomology, London, 1964. He represents the Institute on the British Standards Sub-Committee for Insect Tests on Wood Preservatives.

103. Mr. Sands was awarded a Leverhulme Research Grant which enabled him to undertake taxonomic studies at Chicago University during the first three months of 1962.

104. During the year, visitors working on the collections under the care of the Unit

included Dr. Kumar Krishna, Chicago, and Mr. W. Wilkinson, of the East African Agriculture and Forestry Research Organization.

105. An increasing number of inquiries about termite damage have been dealt with, especially in the field of plastics. Reprint No. 44, *Recognition of Termite Damage*, has been widely distributed and a further article appeared in *New Scientist* during March, 1962. Damage to buildings over a wide geographical range, from the West Indies, the Middle East and Africa, to Hong Kong, has been the subject of a number of inquiries.

106. A report on the work of the Unit in West Africa was issued by the Colonial Office early in 1961. Two papers on termite biology by Mr. Sands appeared during the year. Articles of a more popular nature by Mr. Harris appeared in *Pest Technology*, *New Scientist* and the *Windward Islands' Annual*. Mr. Harris's book *Termites, their recognition and control* was published by Longmans, Green & Co. in their Tropical Agricultural Series.

107. *Acknowledgements.* It is a pleasure to record the thanks of the Institute to Dr. T. C. Morrison-Scott, the Director, and to Mr. J. P. Doncaster, Keeper of Entomology, British Museum (Natural History) for the facilities afforded to the members of the staff of the Institute who work in the Museum, and to acknowledge the continued close and friendly co-operation of the staff of the Museum.

Commonwealth Mycological Institute

108. *General.* The Director in company with Mr. E. O. Pearson, Director, Commonwealth Institute of Entomology, attended the annual meeting of the Inter-African Phytosanitary Commission at Ibadan, Nigeria, in October 1961 and spent some two weeks visiting agricultural research centres in Nigeria and Ghana at the request of the respective governments. He also visited a new state farm project at Akatsi, Ghana, to advise on tobacco diseases and inspected coconuts affected by Cape St. Paul wilt in the Keta area.

A large number of overseas visitors with specialist interest in mycology and plant pathology have been received at the Institute, coming from Australia, Canada, Ceylon, Denmark, Ghana, India, Italy, Jamaica, Japan, Kenya, the Netherlands, North Borneo, Nigeria, Pakistan, the Philippines, Sierra Leone, Sweden, Tanganyika, Uganda, United States of America, and USSR. An increased number of research officers from U.K. centres have also spent varying periods in the laboratories.

Parties of students, many from Commonwealth countries, have also been shown the work of the Institute with suitable explanatory talks. They include scholars and students from the Botany School, Cambridge, Imperial College, London, and Wallington County Grammar School.

109. *Library.* The work has now settled down to a steady routine after the re-organization of last year. A library committee has been constituted, representing the various sections of the Institute, to review the needs of each in relation to the others, to accelerate the programme of binding within the financial allocation, and to expand exchange arrangements.

The following additions were made during the year: 100 books; 8 journals by subscriptions and 9 on regular loan; 1,250 reprints; 8 photostats; and 309 microfilms. Total holdings are 2,650 books; 616 journals; 56,900 reprints; 3,317 microfilms.

The transfer of the DSIR Lending Library to Boston Spa was effected smoothly and the close co-operation of this unit in supplying the needs of the Institute is again gratefully acknowledged.

110. *The Review of Applied Mycology.* In the interests of economy it has been decided to discontinue the use of Cyrillic characters from Vol. 41 onwards. Titles are being transliterated according to the British Standard system.

Further advance has been made in abstracting Japanese papers from the original so that less reliance has to be placed on English summaries.

Vol. 40, comprising 768 pages plus the Index, was issued, containing 3,250 abstracts.

111. *The Review of Medical and Veterinary Mycology.* The subject and author index to Vol. 3 was issued in December and Vol. 4 commenced with the March 1961 number. It will continue to be published with 32 and 48 pages in alternate numbers.

112. *Index of Fungi.* The number of entries continues to increase and the work of compiling has again been done by Mr. Deighton with the assistance of Mr. Sutton. The cumulative Index to Vol. 2 has now been prepared for lithographic reproduction and should be issued before autumn 1962. This is very intricate work which can only be done by a suitably trained typist so that date of publication is dependent on the availability of typing staff. For this reason the final preparation of the list of fungus names omitted from Petrak's Lists has been delayed owing to priority being given to the Index to Vol. 2.

113. *Commonwealth Phytopathological News.* Owing to uncertainty as to the future of this publication regular receipt of copy from the correspondents who have so admirably supported it in the past was withheld. In consequence, great difficulty was experienced in compiling the last two numbers of the year. All past contributors as well as Official Correspondents have now been circularized that the journal will continue and promises received of more regular contributions in the future. The circulation of *C.P. News* has increased, and, although still comparatively small, there is no doubt that it is read by a large number of agriculturists as well as plant pathologists and is fulfilling the purpose for which it was originally designed, namely, to keep Commonwealth plant pathologists in touch with colleagues in all parts of the world.

114. *Identification Service.* The number of identifications made again showed a substantial increase, 6,728 specimens having been received (5,041 in 1960/61), bringing the total accessions to 91,690. They came from Australia, British Guiana, British Honduras, British Solomon Islands, Canada, Ceylon, Cyprus, Fiji, Ghana, Great Britain, Hong Kong, India (240), Jamaica (300), Kenya, Malaya, Mauritius, New Hebrides, New Zealand, Nigeria, North Borneo, Northern Rhodesia (over 400), Nyasaland, Pakistan (over 700), Papua and New Guinea, Sarawak, Seychelles, Sierra Leone, Southern Rhodesia, Tanganyika, Tasmania, Trinidad, and Uganda.

Identifications were also made of specimens from Argentina, Brazil, the Congo, Denmark, Ecuador, Egypt, Ethiopia, Germany, Italy, Korea, Libya, the Netherlands, New Caledonia, the Philippines, Samoa, South Africa, the Sudan, Thailand, Turkey and the United States.

Collections were presented to the Herbarium by Dr. J. Kochman (Mycotheca Polonica Fasc. I–XII); Prof. Batista, University of Recife, Brazil; Dr. Boedijn, the Netherlands; and Dr. Petrak, Vienna.

Dr. Ellis continued his revision of the Hyphomycetes and published a paper dealing with 10 species of *Helminthosporium*, 11 of *Exosporium*, 2 new genera *Curvulariopsis* and *Pendulispora*, and 10 species in the genera *Spondylocladiella*, *Annellophora*, *Sporidesmium*, *Stigmina*, *Endophragmia*, *Acarocybe*, *Balladynopsis*, and *Corynespora*.

He was elected to serve on the Secretarial Committee for Mycology of the 10th International Botanical Congress to be held in Scotland in 1964.

Dr. Booth has continued his revisionary studies of the Ascomycetes in the Herbarium in conformity with the accepted modern classification. He is specialising in Pyrenomycetes and the genus *Fusarium* and arrangements have been made for him to spend three months, from April 1962, with Dr. W. L. Gordon in Winnipeg to study the latter's techniques for the culture and identification of this genus.

He published *Mycological Paper* No. 83, "Studies of Pyrenomycetes VI"; also "Black Cross of Banana" jointly with Dr. D. Shaw of Papua and New Guinea in *Commonwealth Phytopathological News*. He has also had a joint paper with Dr. R. M. Nattrass of Kenya and Mr. Sutton, "*Rhynchosphaeria cupressi* causing canker in Kenya", accepted for the *Transactions of the British Mycological Society*.

Mr. Deighton has continued his critical studies of the important genus *Cercospora* and allied genera and of West African fungi in general. Greatly increased numbers of specimens of *Cercospora* species are now being received for identification and are being used for the preparation of a comprehensive paper which it is hoped to complete by the end of 1962.

He visited Vienna, Neuchatel and Geneva in July in connection with this study and, in consultation with Dr. Petrak, was able to examine many valuable but otherwise inaccessible specimens.

He published "Formae speciales and the Code" in *Taxon*, jointly with Drs. J. A. Stevenson and G. B. Cummins.

Mr. Pirozynski continued the preparation of the *Distribution Maps of Plant Diseases* and the identification of leaf ascomycetes: Microthyriales, Perisporiales, Dothidiales, and Discomycetes.

He prepared *Mycological Paper* No. 84, now in the press, proposing 7 new species and 5 new combinations.

Mr. Sutton undertook general identification of Coelomycetes and made considerable advance in the study of the vegetative characters of graminicolous species of *Colletotrichum* which he is submitting to statistical analysis. This is a new approach which may ultimately lead to a re-classification of this difficult genus.

He published *Mycological Paper* No. 80 "Coelomycetes I. Studies on the development and subsequent growth of conidia of *Pestalotiopsis*, with notes on 5 species", and has another in preparation on miscellaneous Coelomycetes: also British records No. 58 "*Pollaccia radiosa* (Lib.) Bald. & Cif. on *Populus tremula*" in *Trans. Brit. mycol. Soc.*, and has two papers in the press, namely, "A review of 'Monograph of *Monochaetia* and *Pestalotia*' by E. F. Guba", and "*Colletotrichum dematium* (Pers. ex Fr.) Grove and *C. trichellum* (Fr. ex Fr.) Duke" for *Trans. Brit. mycol. Soc.*

Mr. Laundon has continued the identification of Basidiomycetes, particularly the rusts, and has commenced to identify the smuts, a task previously undertaken by Dr. Ainsworth.

He is making progress with monographic studies of rusts and has nearly completed a

survey of those on Acanthaceae. The results are being subjected to computer treatment by the kind co-operation of Rothamsted Experimental Station and a quantitative measure of similarity between groups of individuals (species, genera, families) is being obtained.

The ornamentation exhibited by uredo- and teliospores has been examined using the electron microscope and carbon replica techniques in collaboration with Mr. H. L. Nixon of Rothamsted.

He has also made headway in the study of rusts on Aceraceae, Actinidaceae, Adoxaceae, Aizoaceae, and Amaranthaceae.

Mr. Laundon is technical supervisor of photographic work for the herbarium and has obtained much improved results by employing microfilm with a low contrast development method which he devised.

Miss Waterhouse devoted most of her time to editorial duties but also continued her studies and identification of the Phycomycetes, 134 specimens being reported on.

For some time she has been engaged on the production of a world key to the genus *Phytophthora*, which would be of the greatest value to pathologists everywhere. Through the kind offices of Dr. P. H. Gregory, her findings have been subjected to treatment by the computer at Rothamsted and it is hoped to have the finished key by midsummer. She has also nearly completed a paper on the genus *Pseudoperonospora*.

115. *Culture Collection.* The total number of cultures maintained was 3,866 (3,129 in 1960/61). New accessions totalled 803 and 66 cultures were discarded. The sharp increase in accessions was mainly caused by the acquisition of 378 cultures from the collection of the London School of Hygiene and Tropical Medicine, Biochemistry Department, which is being closed down. Many of these cultures are of great academic and industrial interest and their preservation for future research workers was considered essential. These cultures have never been fully catalogued and will be incorporated in a consolidated index to be published by the Institute.

The number of cultures supplied was 2,131 and again showed a small increase. They were distributed as follows (year 1960/61 in parentheses): research and education, Commonwealth, 829 (869); extra-Commonwealth, 23 (46); industrial, Commonwealth 999 (837); extra-Commonwealth, 97 (131); free and exchange 183 (181). The prices of cultures were increased on 1st April, 1961, and total sales amounted to £2,130 (£1,044).

Again a varied collection of inquiries has been received ranging from toxin-producing fungi in groundnuts to moulding of delicate electronic equipment. Particularly large batches of specimens of mouldy groundnuts have been examined by Mr. Elphick for the Tropical Products Institute in connection with serious toxicity causing the death of large numbers of poultry, and a further large batch identified which were associated with microbial deterioration of palm oil in West Africa. He has continued to specialize in the genera *Penicillium*, *Aspergillus*, *Paecilomyces*, and *Verticillium*.

Assistance has been given to commercial firms on problems concerned with contamination of bottled fruit juice due to a fungus with heat resistant spores, the browning of Stilton cheese due to a brown mutant of the normal blue-veining *Penicillium roquefortii*, and samples of mould in a meat soup.

Recommendations were made among numerous others for the control of moulding

on cigarette filter rods, waxed typewriter stencils, electrical equipment, slow drying plasters, and asbestos/cement cladding in the tropics.

Investigations were carried out for oil companies and aircraft manufacturers on a most unusual problem of a mould, *Cladosporium resinae*, which was contaminating kerosene fuel tanks on jet aircraft. The mould metabolizes the fuel in the presence of small amounts of water of condensation, resulting in serious corrosion of tanks and internal structural parts and the blockage of filters. The problem was discussed at length at the Institute with Dr. G. Hazzard of the Defence Standards Laboratory, Melbourne, Australia, and Mr. N. I. Hendey of the Admiralty Materials Laboratory, Poole, and recommendations were made for control of the mould.

The Culture Collection staff have also been consulted on suitable methods of investigating mould growth in lubricating oil/water systems in Australia.

Miss Stockdale continued her researches on the perfect states of keratinophilous soil fungi and also identified 89 yeasts, a collection of which has been sent to the Brewery Research Foundation at Nutfield. She prepared a demonstration and wrote a paper for the Medical Mycology Committee meeting to be held at the Institute in April.

The well-known mycologist, Mr. George Smith, following his retirement from the London School of Hygiene and Tropical Medicine, is completing his taxonomic studies of *Paecilomyces* and related genera in the Culture Collection laboratory. His advice has been of great assistance to members of the staff.

Assistance has again been given to the British Standards Institute and the Ministry of Aviation DEF.5011 specification committees.

116. *Bacteriology*. There has been a marked increase in the number of accessions, 411 specimens and cultures having been received (288 in 1960/61). They came from British Guiana (18), India, Jamaica, Kenya, Malaya (31), Nigeria, Northern Rhodesia (48), Nyasaland (20), Papua and New Guinea, South Africa, Southern Rhodesia (40), Tanganyika, Trinidad, and Uganda (16), a wide variety of plant materials being represented.

Among interesting records was a pseudomonad closely allied to *P. stizolobii* on Bougainvillea; *Xanthomonas uredovorus* in rust sori on wheat; *Erwinia aroideae* causing a stalk rot of sunflower; the first record of *Pseudomonas solanacearum* on ginger, in Malaya; and a brown leaf blotch of *Dioscorea* yam associated with a *Xanthomonas* sp. The last record is of considerable interest as little is known of the diseases of *D.esculenta*.

The comparative study of bacteria pathogenic to sugarcane obtained by Dr. Hayward on his visit to Mauritius, Réunion, and South Africa was completed and a paper prepared for publication in the technical bulletin of the Mauritius Sugar Industry Research Institute.

Further work on laboratory typing of strains of *Pseudomonas solanacearum* was done and the results incorporated in a new edition of *Distribution Maps of Plant Diseases*. Laboratory work is also in progress on the systematics of the yellow, Gram-negative, oxidative or fermentative bacteria associated with healthy and diseased plants.

Dr. Hayward published "Survival of bacterial pathogens in herbarium specimens", in *Commonwealth Phytopathological News*, and jointly with Mr. W. Hodkiss of Torry Research Station, Aberdeen, "Taxonomic relationships of *Xanthomonas uredovorus*", in *J. gen. Microbiol.*

He also read a paper on "Geographical variation in *Pseudomonas solanacearum*" at a meeting of the Society for Applied Bacteriology.

117. *Information Service.* The following orders for photographic reproductions have been supplied:

Microfilms:	Commonwealth	76 orders
	Foreign	34 orders
Photocopies:	Commonwealth	12 orders.

Photo-offset printing was as follows: *Bibliography of Systematic Mycology*, 2 parts; Culture Collection Catalogue, 2 Supplements; *C. P. News*, 1 part; and miscellaneous reports, circulars, and a four-page guide to the Institute.

A good deal of reprinting was also undertaken: *Review of Applied Mycology*, 20 parts; *Mycological Papers*, 2; Culture Collection Catalogue, 1 and 1 supplement; *Bibliography of Systematic Mycology*, 2 parts; *Distribution Maps of Plant Diseases*, 11; *Index of Fungi*, 1 part.

Photographic reproductions for the Herberium comprised 3,036 pages of diagnoses, 217 bromide prints, and 32 lantern slides for lectures.

Other information supplied is included under Library and Identification Service.

118. *Inter-African Phytosanitary Commission.* The compilation of the list of important plant diseases not yet recorded in Africa has been greatly hastened by the preparation of a card index of the Institute's *Distribution Maps of Plant Diseases* for each host genus/pathogen combination. This has been divided into diseases occurring in Africa and those not yet recorded and further sub-divided into those restricted to temperate and tropical areas, to islands, or to definite continental regions. In response to specific inquiries from the Scientific Secretary of the Commission the following information has been supplied:

A. An up-to-date digest on blue mould of tobacco, which is being published as an *Occasional Paper*.
B. "Bayoud" disease of date palm.
C. *Mauginiella* inflorescence rot of date palm.
D. Rusts recorded on *Pinus* spp. grown in Africa and their alternate hosts.
E. Distribution of onion smut and its occurrence on garlic.
F. Control of banana leaf spot in French Cameroons.
G. The occurrence of Panama disease of bananas in French Cameroons.
H. Control of *Trachysphaera* rot of bananas.
I. List of new records of crop diseases in Africa.
J. Tobacco vein-browning disease.
K. Distribution and control of seed infection by *Pseudomonas pisi*, *Corynebacterium flaccumfaciens*, and *C. michiganense*.
L. Distribution of 17 pathogens for Somalia.
M. List of the principal diseases of banana, cacao, citrus, coconut, coffee, groundnuts, *Hevea* rubber, maize, oil-palm, pineapple, and rice, with their importance and distribution.

119. *Pool of Plant Pathologists.* Dr. Wheeler completed his investigation of withertip of limes (*Gloeosporium limetticola*) in Zanzibar in June and resigned to take up an academic post at Imperial College, London. He confirmed his earlier findings that the

disease could be economically controlled by phenyl mercury nitrate sprays and is preparing his report for publication by the Institute.

Mr. C. L. A. Leakey was appointed to the Pool in June and commenced an investigation of the red blister berry disease of *robusta* coffee in Uganda by the examination of diseased material at the Institute. In September, he left for Uganda where he has continued the work as well as making a survey of bean diseases. So far, the cause of the coffee disease has not been determined, but collections of bean diseases have revealed a number not previously recorded in Uganda.

120. *Publications.* The prices of periodicals was increased on 1st January, 1962, and it is not yet possible to assess the final effect on distribution. Sales of publications and cultures (the prices of which were also put up), however, have shown an unprecedented increase of £5,352, a record amount of £17,007 being received at the end of the financial year. Subscribers to the *Review of Applied Mycology* increased by 16, from 1,535 to 1,551 and sales from £6,588 to £8,883 (back numbers £2,047), the total distribution, including quota and free or exchange copies, being 1,848.

The distribution of the *Review of Medical and Veterinary Mycology* increased from 458 to 466 and sales from £946 to £991. The assistance of outside abstractors, particularly Prof. Juan E. Mackinnon of the University of Montevideo, is gratefully acknowledged.

Mycological Papers, No. 80, Coelomycetes 1, by B. C. Sutton
No. 81, Host lists of Kenya fungi and bacteria, by R. M. Nattrass
No. 82, Dematiaceous Hyphomycetes III, by M. B. Ellis
No. 83, Studies on Pyrenomycetes VI. Thielavia, with notes on some allied genera, by C. Booth,

were issued. Sales amounted to £888 (£900 in 1960/61).

No new *Phytopathological Paper* was published, but advance copies of No. 4 "The fusarial wilt (Panama disease) of banana and other *Musa* species" by Dr. R. H. Stover were received at the end of March. Sales in 1961/62 amounted to £44 (£49 in 1960/61).

The distribution of *Commonwealth Phytopathological News* increased by 25 to 459, but sales dropped from £109 to £103. The distribution of *Index of Fungi* dropped from 424 to 405, but sales increased from £374 to £740 due to sales of back numbers.

The distribution of the *Bibliography of Systematic Mycology* and the *Distribution Maps of Plant Diseases* both increased, the former from 95 to 114 and the latter from 370 to 375, the corresponding figures for sales being £146 (£89) and £329 (£228).

The promised success of the fifth edition of the "Dictionary of the Fungi" was maintained beyond expectation, sales amounting to £1,427. Other books in demand were "Herb. I. M. I. Handbook" (£190), "Tobacco Diseases" (£191), "A Manual of Rice Diseases" (£59), "An Annotated List of Seed-borne Diseases" (£50), and "Ustilaginales of India" (£19).

Dr. Tarr's book "Diseases of Sorghum and Sudan grass" is still with the press in the galley stage, but is expected to be issued in the summer of 1962.

121. *Changes of staff.* Dr. Ainsworth was appointed Assistant Director on 1st April, 1961.

122. *Miscellaneous.* It is interesting to note that a series of 12 background talks on mycology, bacteriology, and plant pathology was given weekly by members of the scientific staff of the Mycological Institute to the abstractors in order to bring their knowledge up to date.

A series of conferences by the scientific and technical staff has also been initiated. It is proposed to hold four a year at regular intervals to review the work in progress at the C.M.I. and to give junior staff some practice in delivering and criticizing papers.

The Mycological Institute again prepared an exhibit for the Annual Conversazione of the London Branch of the Institute of Biology and held an Open Day during the Commonwealth Technical Training Week when the work of laboratory technicians and the opportunities available for training at local colleges was emphasized. A student from Brunel College of Technology who was taking a "sandwich" course was engaged as temporary technician for six months.

Commonwealth Institute of Biological Control

123. Headquarters of the Commonwealth Institute of Biological Control have remained at Ottawa though preparations are being made for the move to Trinidad. The Director spent some time at the Indian, Pakistan and European Stations, with a visit en passant to the Californian Station, and has also been on tour visiting Hawaii, Japan, Taiwan, Hong Kong, Brunei, North Borneo, and later the Bahamas. As a result of these visits and discussions held a number of additional projects have been requested.

124. Arrangements have now been made to start work in East Africa. An additional entomologist has been appointed specifically for this and will leave for East Africa in April 1962.

125. Dr. Lloyd is at present working in southern South America; Dr. Bennett has carried out investigations in Brazil, Barbados, Grenada, St. Vincent and British Guiana; Dr. Ghani spent ten weeks in Java: Dr. Rao two months in Hong Kong and one in southern Malaya, with visits in transit to the Philippines, Cambodia, Thailand and Ceylon; Dr. Pschorn-Walcher spent six months in Japan.

126. At the Californian Station work has been done on projects for Australia, Canada, the Seychelles and Cyprus. Dr. Lloyd in South America has worked for Australia, Bermuda, Canada, Mauritius, New Zealand, Cyprus and South Africa. At the European Station work has been done for Australia, Canada, Mauritius, New Zealand and the USA. At the Indian Station for Ceylon, India, Mauritius, New Guinea, the South Pacific Commission, the West Indies, USA, Mexico, Portugal, Switzerland and Taiwan. At the Pakistan Station for Australia, Canada, Mauritius, Pakistan, the West Indies and USA. At the West Indian Station for Australia, the Bahamas, Barbados, Bermuda, Grenada, St. Vincent, the West Indies, the Federation of Rhodesia and Nyasaland, the Cocos Islands, North Borneo, Portugal and USA. In addition Dr. Pschorn-Walcher worked in Japan on projects for Canada, New Zealand and Pakistan.

These projects have necessitated extensive travel by most members of the staff, who have also during the year produced *12* papers comprising *317* pages dealing with various aspects of biological control.

127. Shipments totalling *764* comprising *472,100* individuals of *164* species of beneficial insects (and snails) have been sent to *31* countries during the course of the year in connection with *90* projects.

128. Dr. O. Eichhorn joined the staff and is stationed at the European Station. Dr. D. J. Greathead was also appointed for work in East Africa.

129. There has been continued increase in the demands by Commonwealth countries for the services of the Institute with a considerable increase in project funds (approximately 60% greater than in 1960/61).

130. The first of what it is hoped will be a series of Technical Bulletins was published in December 1961. In these, papers by members of the staff dealing with various aspects of biological control will be published.

Commonwealth Bureaux

Animal Breeding and Genetics

131. *Staff.* Mr. J. D. Turton, M.R.C.V.S., has been appointed Assistant Director.

132. *Accommodation or Equipment.* Work on the new headquarters of the Animal Breeding Research Organization, in which the Bureau will be housed, was begun in March.

133. *Publications.* Volume 29 of *Animal Breeding Abstracts* contained four review articles and a total of 2,471 abstracts and titles, made from twenty-two languages. Of the total, 51·2% were from English language publications and 48·8% from foreign languages. 96% of abstracts were made by the Bureau staff.

T.C. No. 15, "The Semen of Animals and Artificial Insemination", was in the press and due to be published shortly.

134. *Information Service.* There were 80 inquiries for information, involving the preparation of some 37 lists of references. Of the 80 inquiries, 30 were from people in the United Kingdom, 33 from other Commonwealth countries and 17 from foreign countries. As in previous years, they covered the usual wide range of subjects, including requests for information on the development of artificial insemination in pigs in Britain (from Malaya); on sources of bull semen (India, Peru and Uruguay); on freeze-drying of bull semen; inheritance of twinning in cattle (Canada); ovarian activity in Zebu cattle; inherited abnormalities in equines.

The Bureau also dealt with 5 requests for translations, 7 for photo-copies of papers and 3 for typescripts of papers.

135. *Library.* The library borrowed over 1,500 items of literature and issued on loan 673 items. There are now 2,118 books and 181 runs of journals in the library. The Bureau has been building up a collection of livestock photographs and this has now been catalogued and arranged.

Animal Health

136. *Staff.* There were no changes during the year. Extra work, caused by three cases of serious illness requiring prolonged treatment in hospital, was willingly undertaken by the rest of the staff. Happily all three who had been ill had returned to work by the end of the year.

137. *Publications.* All three periodical publications were produced regularly. Volume 31 of the *Veterinary Bulletin* contained 4,221 abstracts and the volume index was sent out to subscribers in February 1962. Sales increased from 1,330 in 1960 to 1,379 in 1961. The total distribution was 1,688. The price was raised from 70/- to 120/- as from January 1962. Figures for sales so far available do not indicate any falling off as a result.

Sales of *Index Veterinarius* were 441 as compared with 416 in the previous year. The total distribution was 457. The price was raised from £5 to £10 as from the October 1961 issue; this incidentally was the first increase in price for 25 years. Figures so far available do not indicate any serious falling off in sales as a result of the very considerable increase in price.

As recommended by the 1960 Review Conference the third periodical, *Veterinary Reviews and Annotations*, ceased publication in October 1961. During its seven years of publication the total distribution had risen from 419 to 712. The total cost of printing it by photo-offset had been £2,827 and total revenue £4,327. The reviews formerly published in this journal are now appearing in the abstracting journal *Veterinary Bulletin*.

No technical communications were published during 1961.

138. *Information Service*. Eighty-four inquiries on a variety of subjects were received. Of these 6 were from foreign countries, 13 from Commonwealth and contributing countries and 65 from the U.K. Among the subjects dealt with were: effects of explosive blast on pregnant cows; salt supplements to the diet of war dogs in tropical countries; changes in the incidence of keds in sheep; foot and mouth disease in elephants; photosensitization in livestock; survival of pathogenic viruses and bacteria in frozen semen and in artificial insemination of cattle; vaccines for Newcastle disease; and many others.

139. *Miscellaneous*. A talk on the work of the Bureau was given to the Annual Conference of the Veterinary Students Association and some 300 specimen copies of the *Veterinary Bulletin* were presented to the members. FAO included in their Animal Health Yearbook for 1960 a contributed article on the work of CAB and in particular of this Bureau. Revenue from advertisements in the Bureau's journals amounted to £372 and books to the value of £274 were received from publishers for review.

Animal Nutrition

140. *Staff*. The appointment of a Scientific Information Officer to take effect from the beginning of the next financial year means the end of a period of two years and two months during which, except for two months, the Bureau's sanctioned establishment has not been complete.

141. *Publications*. For the first time in a decade *Nutrition Abstracts and Reviews* showed, in Volume 31, a diminution in size compared with the preceding year. The total number of abstracts was 5,349 and of titles 5,701 giving a total number of entries 11,050 which was 391 fewer than in Volume 30. Two of the four review articles printed during the year were produced in the Bureau. Of the others one was by Dr. Louise J. Daniel of Cornell University, Ithaca, New York, and one by Mr. I. McDonald of the Rowett Research Institute. A Technical Communication, *The Nutrition of the Young Pig*, by Mr. I. A. M. Lucas and Dr. G. A. Lodge of the Rowett Research Institute, was published.

142. *Information Service*. The number of inquiries received, 39, was five fewer than in the preceding year. Those from the Commonwealth numbered 31 and 8 were from foreign countries. Of particular interest were those from Western Australia on the feeding of marsupials, from Malta on the utilization of onion peelings in the feeding of livestock and from the Wildfowl Trust on grazing by wild geese.

Publications, requested by outside borrowers through the Bureau and supplied from the Reid Library, numbered 23. Bibliographies on vitamin D in the nutrition of ruminants and on the parboiling of rice were prepared and distributed to Official Correspondents thought likely to be interested in those subjects.

143. *Special project.* Work on *A Classification of Knowledge on Nutrition Coded for Machine Retrieval* was completed and its submission to tender for printing was imminent at the end of the year. The first stage of the project can therefore be regarded as complete. For the second stage, which is the preparation of punched cards containing the information included in the entries in the back volumes of *Nutrition Abstracts and Reviews*, extra clerical staff will be required and for them temporary accommodation has been built and is ready for occupation.

144. *Sales.* Total circulation of *Nutrition Abstracts and Reviews* continued to increase being 2,237 for Volume 31, 99 more than for Volume 30. The number of subscribers went up by 94 to 1,927.

Dairy Science and Technology

145. *Staff.* No change.

146. *Publications. Dairy Science Abstracts* was published regularly each month throughout the year.

Volume 23 (1961) contained 3,281 abstracts, 332 title entries and 33 news items—a total of 3,646 entries. In addition, 8 review articles were published covering a wide range of subjects in the dairy field and written by scientists from the United Kingdom, Canada, the United States and the Netherlands.

Coverage of the literature continued to increase and a total of 575 journals are now scanned regularly, apart from numerous bulletins, annual reports, patents, books and other publications. A special effort is being made to cast the net more widely and to include abstracts of papers from more obscure journals in *Dairy Science Abstracts.*

The proportion of foreign language abstracts and titles amounted to 40·2% of the total number of entries in Vol. 23 of *Dairy Science Abstracts.* German and the Eastern European languages continued to be the most important of the foreign languages.

147. *Journal Sales.* The sales of *Dairy Science Abstracts* continued to rise during the year and the total subscriptions to Volume 23 of the journal reached a record total of 1,914. The total circulation of the journal (including free and quota copies) rose from 2,079 for Volume 22 to 2,140 for Volume 23.

148. *Information Service.* The total number of inquiries received and dealt with by the Bureau during the year totalled 197. Of these, 122 came from Commonwealth countries and 75 from foreign countries.

The following are examples of a number of interesting inquiries received from Commonwealth countries:

(a) Information on deep freezing of goat's milk. (U.K.)
(b) Bibliographies of literature on trace elements in milk and on milk composition during oestrus. (India)
(c) Information on methods of reducing noise in dairies. (U.K.)

(d) Literature references on preparation and storage of butter oil. (Canada)

(e) Information on plastic milk bottles. (Canada)

(f) List of recent publications on tests for the control of efficiency of pasteurization. (Australia)

(g) Information on methylene blue and phosphatase tests. (Mauritius)

(h) Literature and publicity on tropical dairying. (India)

(i) Information on shape of udder and number of teats in camels with a view to mechanical milking. (U.K.)

149. *Publicity.* Bureau publications were displayed with some success at the Overseas Reception Office at the Dairy Show in London in October 1961.

150. *Advertisements.* Volume 23 of *Dairy Science Abstracts* contained 24 pages of paid advertisements.

151. *Miscellaneous.* The Director made an 8-week Tour of Canada and the United States during May and June 1961, visiting Dairy Research Institutes, dairy farms and factories, and contacting many Government Officials and dairy scientists. During the Tour, he attended the annual meeting of the American Dairy Science Association and addressed them on the subject "Handling the World's Dairy Science Literature".

Forestry

(*Note:* Figures in parentheses are last year's, for comparison.)

152. *Staff.* A second year—thankfully recorded—of stability and consolidation at all levels. The addition of a second Senior Clerical, who is engaged primarily on managing the coverage of the Bureau's ever-growing literature, has released experienced S.I.O.'s for almost whole-time attention to abstracting.

153. *Publications.*

(a) The timely production of *Forestry Abstracts* continues to be the major preoccupation of the staff. There were delays, for which illness at the printers was only partly to blame, in the appearance of issues Nos. 2–4, and especially of the annual index to Vol. 21, but steps have been taken, in conjunction with the printers, to insure prompt publication in future. The index to Vol. 22 should be out before the end of April. This volume is the biggest to date, and Vol. 23 will inevitably be bigger still, despite pruning to the limit. Vol. 22 contained 5,319 (5,237) notices from 35 (34) languages, extending to 645 (640) pages.

(b) *Coverage of literature.* Collaboration with FAO on the new Coverage List of periodicals and serials was practically completed during the year and a third instalment is about to appear. Total regular coverage increased to 531 (517) periodicals and 878 (851) serials.

(c) *The Botanical Pool* of circulating literature (some 251 items) continued to be run by this Bureau, which also continued the distribution of scientific literature received at Head Office.

(d) *Occasional Publications.*

(i) *Special projects.* Editing of the draft of Part II of the five-year index to Volumes I–V of *Forestry Abstracts* had to be suspended owing to the prior

claim on editorial time of an undue accumulation of abstracts which is being worked off over the earlier issues of Vol. 23.

(ii) *Technical Communications.* Compilation of the T.C. on Shelterbelts continues.

(e) *Centralized Title Service.* This weekly service of abstract references continues to grow, though mainly now outside the Commonwealth. A total of 120 (112) subscribers in 39 (37) countries received 1,267,144 (988,280) carded references during the year. New countries subscribing were the British Solomon Islands Protectorate and Sarawak.

154. *Information Service.* (a) A total of 27 (31) inquiries was received and dealt with from member or associated countries, plus 13 (5) from outside. Among topics on which information was provided were:

1. Forestry literature on Mexico
2. Ecology of the tropical rain forest
3. Rearing of Australian tree species outside Australia
4. Wattle cultivation in South Africa
5. Impregnation of standing trees with preservatives
6. Deer, rabbit and bird repellents
7. Effect of detergents on *Pinus radiata*
8. Industrial uses of gum arabic
9. Selection, storage, treatment, etc., of Malacca canes
10. Legislation on control of water catchments and its implementation.

(b) In addition there were 39 (33) requests from the Commonwealth for literature, involving 56 (170) items; 7 (13) requests for photostats and 1 translation were also supplied.

155. *Miscellaneous.* The authorized Italian edition of the *Oxford System of Decimal Classification for Forestry* has suffered delays in Italy and is not yet out. A Portuguese version is under Bureau scrutiny. A Swedish one has recently been promised by Stockholm.

Helminthology

156. *1960 Review Conference Recommendations.* The committee of experts appointed to inquire into the future of the Bureau made the following recommendations which were accepted by the Executive Council: that the Bureau should continue as a separate entity at The White House, St. Albans, and that the identification and taxonomic service should continue and should make provision for plant-parasitic nematodes.

157. *Changes of staff.* Professor B. G. Peters, M.Sc., Ph.D., Hon. A.R.C.S., Professor of Parasitology in the Department of Zoology and Applied Entomology, Imperial College of Science and Technology (University of London), was appointed Consultant Director; Miss Sheila M. Willmott, Ph.D. was appointed Director; and Dr. H. H. Williams was appointed Assistant Director.

158. *Distinguished visitors.* Amongst the 20 overseas scientists who visited the Bureau during the year were: Dr. S. N. Banerjee (India), Dr. & Mrs. Theodor Von Brand (USA), Prof. T. W. M. Cameron (Canada), Dr. D. W. Fenwick (Trinidad), Dr. J. H. S. Gear (South Africa), Dr. D. L. Gunn (Ceylon) and Dr. W. B. Mountain (Canada).

159. *Publications.* Volume 27 of the old series of *Helminthological Abstracts* and Volume 30 of the new series were completed and published during the year. Volume 30 contained 2,800 abstracts and titles in 29 languages; Volume 27 contained 1,718 abstracts and titles.

160. *Information service.* 54 requests for information and identification were received during the year, 44 from contributing countries and 10 from non-contributing countries and international organizations. Topics included: incidence of tapeworm and hookworm infections in man and economic effects on the population; treatment of *Dicrocoelium* infection in ruminants; anthelmintics; parasites of giraffe and wildebeest; books, journals, etc., on plant nematology; outbreaks of parasitic gastro-enteritis; extent of nematode disease in horses, pigs and poultry in Great Britain and Ireland; *Heterodera rostochiensis* in potatoes in southern Africa: world distribution of *H. glycines*; stephanofilariasis.

Identifications included: eelworm in Manila Hemp; root-knot nematode on tomato; nematodes and cestodes from African game animals; eelworms on *Oryza sativa*: nematodes in *Gryllus* sp.; helminths in domestic ruminants in St. Helena; eelworms on tea in Mauritius; nematodes from *Oryctes monoceros.*

Loan requests for specific items of literature numbered 90 and for microfilms and photocopies 118.

161. *Miscellaneous.* Mr. W. M. Fitzsimmons, F.R.C.V.S., resigned from his post in August and T. D. Williams, B.A. (Oxon.), Ph.D. (Cantab.), was appointed as Scientific Information Officer to act as Taxonomist.

Mr. J. W. G. Leiper, F.R.C.V.S., has deposited in the Bureau his collection of helminths from animals in Iraq.

It has been decided that one of the existing vacancies in the Pool of Plant Pathologists should be filled by the appointment of a plant nematologist, the person selected to be based on the Commonwealth Bureau of Helminthology.

Horticulture and Plantation Crops

162. *Staff.* No changes in senior staff.

163. *Publications.* (a) *Horticultural Abstracts.* Volume 31, Nos. 1 and 2, were published on time, but No. 3 and No. 4 plus the annual subject and author indexes were issued two to three weeks late. The total number of entries rose to 7,295, an increase of 15% over Volume 30.

(b) *Occasional publications.* Technical Communication No. 27 *Carbohydrate resources within the perennial plant*, was printed in March 1962. Technical Communication No. 28, *Graft incompatibility in fruit trees*, reached the galley proof stage. Several other occasional publications were in various stages of preparation.

164. *Information Services.* Inquiries dealt with rose by 4% to reach a total of 250, which was made up of 110 from the U.K., 64 from the Dominions, 23 from Dependent Territories, 2 from the Republic of Ireland and 51 from foreign countries.

All readers of *Horticultural Abstracts* and Official Correspondents were notified of the availability of copies of replies to the more interesting inquiries. As a result 186 persons were supplied with 735 copies of replies to 82 inquiries.

As usual, the subjects of inquiries covered a very wide and interesting range. Although none calls for special mention, collectively they provide a clear impression of the problems currently of interest to research workers in many countries.

The photocopying service was again widely used, 51 persons being supplied with copies of 171 articles (161 photostats, 10 microfilms). Requests from 10 other people were satisfied in various other ways.

During the year the Bureau was asked to translate 45 articles in 12 foreign languages, but 17 of these had to be turned down for various reasons. Sales of translations totalled 290 copies.

165. *Publicity.* Requests for sample copies of *Horticultural Abstracts* and details of ancillary services numbered about 100, and many of these could be traced to advertisements that had been printed on the back covers of Digests 1 and 2. It is believed that the unusually large numbers of new subscriptions taken out for the journal in 1961—resulting in a net increase of over 70—could be mainly attributed to this form of advertising.

Bureau publications were again displayed at the Chelsea Flower Show held in London in 1961, and they were also shown at the East Kent Fruit show at Canterbury in November 1961.

As in the previous year leaflets advertizing translations were sent to many libraries, but the response has so far been rather disappointing.

Pastures and Field Crops

166. *Changes of staff.* Miss M. Hall, Scientific Assistant, who retired in March 1961, after 28 years' service with the Bureau, was awarded the M.B.E. in recognition of her services.

167. *Overseas visits.* The Director visited parts of Northern France from 22–28 May, with a party organized by the British Grassland Society, to study current grassland research and developments there.

168. *Distinguished visitors.* 29 scientists from overseas visited the Bureau. The CAB Executive Council met at Hurley on 26th October, 1961.

169. *Accommodation or equipment.* One office was taken from the Bureau by the Grassland Research Institute during the year, at a time when an increase in the staff had been planned.

170. *Publications. Herbage Abstracts* and *Field Crop Abstracts* both appeared quarterly, on time, the number of abstracts and titles published in each being 2,007 and 2,041, respectively. These were derived from 12 languages. The annual subject and author indices of both journals were published, bound in, with the last issue of each volume.

The number of periodicals and reports examined was 1,064, after deleting from last year's list numerous publications which were yielding no abstracts.

Owing to the retirement of the only Scientific Assistant specializing in Russian, and the delay in finding a successor, our output of abstracts from Russian literature was low. The search for suitable outside abstractors for Japanese and Chinese literature continued.

Four review articles were published in *Herbage Abstracts* and a tabulated account, in 4 parts, of current research on annual field crops and grasslands in Africa was published in *Field Crop Abstracts*.

The price of both *Herbage Abstracts* and *Field Crop Abstracts* was raised from 50/- to 70/- per volume as from 1st January, 1962.

Four Occasional Publications were published:

Bulletin No. 45—*Research techniques in use at the Grassland Research Institute, Hurley*. By members of the Institute staff.

Bulletin No. 46—*A review of nitrogen in the tropics with particular reference to pastures. A symposium*. Edited by: A Committee of the Division of Tropical Pastures, C.S.I.R.O., Australia.

Mimeographed Publication No. 1/1961—*A bibliography of subterranean clover, together with a descriptive introduction*. By D. E. Symon.

Mimeographed Publication No. 1/1962—*The seed production of some herbage species in temperate regions*. By R. C. Anslow.

Two Occasional Publications are in preparation.

Because of the increasing volume of work on abstracting, it is unlikely that the Bureau will be able to undertake the preparation of any new occasional publications until the staff is increased or the volume of abstracting work reduced.

171. *Information Service*. 61 inquiries (49 from contributing countries and 12 foreign) were answered. In addition 261 requests for references to scientific literature, 24 requests for reproductions (photocopies, etc.), and 21 requests for translations were dealt with.

Inquiries received covered the following subjects, amongst others: environmental influence on seed setting; Pangola grass (*Digitaria decumbens*); tabulated data on 29 tropical pasture grasses; row-width in cereals; cross-drilling of cereals; *Rhizobium* spp., culture techniques; *Vicia sativa*; benniseed (*Sesamum indicum*); influence of temperature and moisture on germination and growth of barley, flax, mustard and other crop seeds; effect of chemical insecticides and fungicides on seed germination and viability; the physiology, habit of growth and cultivation practices for potatoes; IPC and CIPC as potato sprout depressants; irrigation, a comparison of sprinkler and furrow systems; irrigation of lawns in hot climates; toxicity of insecticides; competition in herbage and forage plants.

172. *Miscellaneous*. Compared with 1955, the number of abstracts and titles published in 1961 in *Herbage Abstracts* and *Field Crop Abstracts* rose by over 40% but there has been no increase in the scientific staff during that period.

Because of the continuing difficulty of dealing with the increasing number of scientific articles, reports, etc., received for abstracting, it was found necessary during the year to become even more selective in deciding what to abstract. A larger proportion of the less valuable articles and reports received are now being given titles only, or else short indicative abstracts.

The distribution of *Herbage Abstracts* (1,214 copies*) and *Field Crop Abstracts* (1,107 copies*) increased by approximately 4% and 5%, respectively, during 1961.

325 free specimen copies of our abstract journals were posted to selected individuals and institutes, most of them overseas, with an invitation to subscribe.

* Subscriptions plus quota.

Overseas abstracts. An arrangement was made with the C.S.I.R.O., whereby abstracts are now prepared in Australia, from current scientific journals published there, and sent to this Bureau, by air mail, shortly after the publications appear. In this way, it is hoped to speed up the publication of abstracts from Australian journals, and also to relieve pressure on Bureau staff. It is hoped to make a similar arrangement with D.S.I.R., New Zealand.

As leader of the Working Party appointed to examine methods and costs of preparing CAB abstract journals, a large amount of the Director's time was occupied in this lengthy investigation. The report of the Working Party was submitted on 1st December. Subsequently a memorandum based on the main findings of this report was prepared by the Secretariat for presenting to Council.

Plant Breeding and Genetics

173. *Plant Breeding Abstracts* has continued to appear punctually at the beginning of each quarter. Vol. XXXI contained the record number of 5,525 abstracts and 105 book reviews, plus 8 new journal notices. Publications in 37 languages were examined in the course of preparing *Plant Breeding Abstracts* and 9 other languages were dealt with in the course of the Bureau's work.

174. There were 46 technical inquiries from contributing countries. These included requests for information on the following topics: genetics of vernalization and photoperiodic response in cereals, and reproductive biology of *Pennisetum purpureum*, for Australia; cytogenetics of polyploids, soya bean, oats, red clover and melon, interspecific hybridization in *Medicago*, *Trifolium* and *Lotus*, resistance to drought in wheat and to *Sclerotinia* in sunflower, plot shape and size in cereal trials, and competitive effects in cereals, for Canada; mosaic disease of cassava, for Ghana; chromosome number of *Stylosanthes* sp., heterosis in *Nicotiana*, and cytology of cucumber, for India; cashew breeding, for Kenya; sugar-cane selection, for Mauritius; sunflower and castor-oil plant breeding, and parboiling of rice, for Nigeria; photoperiodism in tea, and maize races, for Nyasaland; vicinism in cotton, for Pakistan; and rye breeding, resistance of sunflower to Orobanche, black-currant and cyclamen pollination, differential uptake of heavy and radioactive elements, male sterility in maize, use of sorghum and millet for malting, colour-inheritance in maize, and history and evolution of peas and groundnut, for the United Kingdom. Assistance was also given to research workers in Argentina, Ethiopia, Germany, the USA and Yugoslavia.

175. Requests for specific items of literature totalled 112; 245 requests were made for bibliographies previously compiled and 17 requests for extended summaries. Three translations were made. The number of microfilms and photocopies supplied was 121.

176. Visitors to the Bureau included Prof. P. C. Mangelsdorf and P. Wrinch, Research Fellow of the Russian Research Centre of Harvard University, both of whom have made extensive use of the Bureau's mechanized information file; Prof. W. E. Sackston, from Canada; M. S. Swaminathan, from India; A. R. Mohajir, from Pakistan; C. M Driver, from New Zealand; and P. C. Misic, from Yugoslavia.

177. The Director represented the Commonwealth Agricultural Bureaux at the FAO Technical Meeting on Plant Exploration and Introduction in Rome on 10–20 July, 1961.

Soils

178. *Staff.* No change.

179. Publication of *Soils and Fertilizers* is up-to-date. The backlog of typing abstracts has been eliminated. Vol. XXIV (1961) contained 3,501 abstracts and six review articles.

180. Technical Communication No. 52, *The Trace-Element Content of Fertilizers*, was published. No. 53, *The Influence of Vegetation on Water Supply*, was made ready for the press.

181. The number of inquiries received was 169, compared with 172 in the previous year. Among the subjects of inquiry were: use of boron fertilizer for potato; ion-exchange equilibria; phosphatase enzymes in soil; fission fall-out in soils and plants; manganese and silicon in plant nutrition; trace-element deficiencies in coconut.

182. Six translations, four from Russian and one each from German and Polish, were made.

183. Eighty-six annotated bibliographies were prepared.

184. The number of rooms occupied by the Bureau increased by 50 per cent.

REVIEWS OF PROGRESS IN THE AGRICULTURAL SCIENCES, BY DIRECTORS

Mycology and plant pathology

185. *General.* It is illustrative of the relatively slow pace of agricultural research as compared with more mechanical sciences (due to the necessity of confirming laboratory findings by experiments in the field), that a similar review to this made three years ago drew attention to numerous advances in both mycology and plant pathology, whilst this report has little of note to record. Those advances are now being put into practice and their implications examined.

Despite this fact the number of scientific papers in the subject is steadily increasing in a wider scatter of journals, but most of these comprise additional facts, many of them repetitive, and not new ideas. This trend has posed a problem for the two abstract journals, the *Review of Applied Mycology* and the *Review of Medical and Veterinary Mycology*, which has necessitated further modification in order to maintain full "cover". The abstracts, however, still remain factual as in the past.

186. The Sixth Commonwealth Mycological Conference was held in London in July 1960 and the report of the proceedings was published in 1961. The agenda was prepared from suggestions emanating from Commonwealth countries and the report provides a useful reference to plant pathological work in progress in many parts of the world, and particularly to advances made in the control of diseases of tropical crops. A feature which has implications for the future was the discussion of the rôle of nematodes in the causation of root disease, which culminated in a recommendation that all plant pathology teaching courses should include some training in plant nematology. More research work is being devoted to this subject and considerable advances have been made in the study of nematodes as vectors of plant virus diseases.

187. *Epidemiology.* Forecasting plant disease outbreaks, which has a long history, continues to receive much attention. Accurate forecasts allow control measures to be applied most economically and with the maximum effect. Reliable forecasting depends on a knowledge of epidemiology and a most valuable by-product of the potato blight forecasting undertaken by the Ministry of Agriculture in England and Wales has been the monograph by A. E. Cox & E. C. Large on "Potato Blight Epidemics throughout the World" (*Agric. Handb. USDA*, 174, 1960) which summarizes concisely a vast amount of information.

One very active sector on the epidemiological front has been the study of the movement of air-borne spores, which has shown, for example, that the outbreaks of black rust on cereals in S.W. England in the late summer originated from outbreaks of rust in N. Africa in the early spring. This has also led to a study of the air spora for its own sake and Dr. P. H. Gregory, whose team of workers at the Rothamsted Experimental Station are predominant in this field, has recently given a masterly summary of both the theoretical and practical aspects of investigations of air-borne spores in his monograph *The Microbiology of the Atmosphere*, 1961.

188. *Introduced Diseases.* Examples of the devastating effects, both financial and social, of the introduction of plant diseases into new territories are well known and have

stimulated legislative action for their eradication and control or for the protection of countries not yet affected. So often in the past successful action has been the exception rather than the rule. Progress in this important phase of plant disease control has, however, been made by the U.K. Ministry of Agriculture, Fisheries & Food in the case of fireblight, the bacterial disease of pear and other Rosaceae caused by *Erwinia amylovora*, which was introduced into Britain in 1957. The comprehensive eradication campaign instituted immediately it was detected appears to have been successful, and although this cannot be assumed confidently for some years to come, the disease has been localized.

Similar success has not been obtained in the eradication of blue mould of tobacco caused by the fungus *Peronospora tabacina* which was introduced into Europe in 1958, although, after one of the most destructive epidemics of a plant disease ever experienced causing an estimated loss of £13 million, tobacco is still being grown extensively and control measures in many areas are proving effective. Such an epidemic in the past would almost certainly have caused the complete collapse of the tobacco industry in Europe. This calamity has, however, exposed serious gaps in our knowledge of the life history of *P. tabacina* and intensive research is being undertaken in Europe and elsewhere to make good this deficiency.

189. *Bacteria.* Plant pathogenic bacteria have continued to attract attention. A reflection of this was the establishment in 1959 at the Commonwealth Mycological Institute of a laboratory for the examination of bacterial plant pathogens. In addition to the identification service, research completed or in progress in this new unit includes the characterization of bacterial pathogens of sugar cane and a study of isolates of *Pseudomonas solanacearum* from many hosts and many different geographical regions.

190. There is increasing interest in the host range of specialization of several important pathogens. Three examples may be noted. In cotton growing areas of the United States it is established that a new race of the bacterial blight pathogen, *Xanthomonas malvacearum*, has arisen to which cotton varieties bred for resistance over many years have proved susceptible. This is of great significance to cotton breeders in other parts of the world and in the Sudan and Uganda, for example, the possible occurrence of race differences is being investigated.

Similar race differences appear to exist in Réunion and Mauritius between isolates of *Xanthomonas vasculorum*, the cause of gumming disease of the sugar cane, and are a threat to the economy of islands whose prosperity is based on established resistant varieties.

A third example, on which there is now much published evidence, concerns the distribution and pathogenicity of the banana strain of *Pseudomonas solanacearum* in parts of Central America and the West Indies. The United Fruit Company research workers in Honduras and Costa Rica have shown that the "moko" wilt disease of banana and plantain is probably confined to Central America and the West Indies. Reports of the disease from Africa and Asia are regarded as doubtful, not being supported by isolation of the pathogen and inoculation tests. The Inter-African Phytosanitary Commission has advised banana growing countries of Africa to restrict the importation of planting material from the affected area.

191. The validity of the present concept of species in the two genera, *Xanthomonas* and

Pseudomonas, including the majority of the known plant pathogenic bacteria, is now being questioned. Numerous species have been proposed on the basis of an apparently new and specific host reaction, but it has long been recognised that the separation of these species by laboratory methods is an impossible task. In the genus *Xanthomonas*, D. W. Dye in New Zealand has adapted a number of so-called "species" to pathogenicity by passage through dwarf bean, *Phaseolus vulgaris*. Similarly, in *Pseudomonas*, the work of H. Stolp in Germany has shown that the green fluorescent plant pathogenic pseudomanads have a tenuous basis as species. This will have an impact on pathology.

192. *Monographs*. There is still great need for monographs both in plant pathology and in mycology. One notable publishing event was the completion in 1960 of J. G. Horsfall & A. E. Dimond's 3-volume *Plant Pathology*, a work which assembles much information. A new, completely re-written, edition of C. W. Wardlaw's Banana Diseases (1961) has received a world-wide welcome and mention may also be made of the Institute's recent *Phytopathological Paper* No. 4, by R. H. Stover, on Panama disease of banana, 1962. A number of useful mycological taxonomic works and monographs have also appeared, mostly from the United States.

193. *Animal Mycoses*. Interest in fungal diseases of animals and man has continued to attract attention and the appreciation that most of the major pathogenic fungi of higher animals are also common saprophytes, particularly in soil and compost, has received further support. In 1959, the Commonwealth Bureau of Animal Health published *Fungal Diseases of Animals*, by G. C. Ainsworth & P. K. C. Austwick, the first comprehensive survey of animal mycoses.

194. Mycotoxicoses have again been in the news. Much work has been done on facial eczema of sheep in New Zealand caused by a ubiquitous mould, named by Dr. Ellis *Pithomyces chartarum* (for which *Sporidesmium bakeri* is now accepted as a synonym), and a toxic principal sporidesmin has been isolated and characterized. Recently the same disorder has been recognised in Australia.

Another mycotoxicosis which has excited the attention of both veterinarians and medical men is a toxicity of groundnut meal associated with the presence of strains of *Aspergillus flavus*. First recognised as the cause of death of many young turkeys in England in 1961, the disorder has since been shown to occur in Brazil, Africa, and other parts of the world. Young ducklings are particularly sensitive to the toxin and used for its biological assay. Toxic meal when fed at lower levels for longer periods to rats caused carcinoma of the liver—a disturbing result in view of plans to use groundnut meal preparations to meet protein deficiency in undernourished people.

Veterinary science

195. *Mycotoxicoses*. In the notes contributed to the Annual Report for 1958/59 mention was made of the finding in New Zealand, after many years of research, that a fungus (*Sporidesmium bakeri*) was the source of the liver-damaging substance which causes facial eczema in sheep. Since then much further work has been done but as yet no major advance in the control of the disease has emerged. This is a good illustration of the complexity of many of the problems which confront veterinary research workers. Some of the difficulty arises from the fact that the toxin-producing fungus (now known as *Pithomyces chartarum*) is a saprophyte which grows on dead or damaged plant

material of a wide variety of species. Had it been a parasite of one or other species of pasture grass a possible solution might have been the breeding of resistant strains of grass or the replacement of the host grass by another species. Treatment of infested pastures with fungicides does not seem to hold out very bright hopes since many fungicides are either too expensive or are themselves toxic to sheep. The chemical composition of the toxin is being intensively studied as are the ecology and other aspects of the fungus.

196. When writing about facial eczema in the 1958/59 Report it was suggested that mycological studies of some other obscure diseases of livestock might be rewarding. Since then there has been some confirmation of that suggestion. A good example was furnished by the so-called X-disease of turkeys which caused heavy losses in young turkeys in England in 1960. Studies at Weybridge eliminated bacteria, viruses and protozoa as causes, elucidated the pathology—a characteristic proliferative lesion of the liver—and suggested that the disease was caused by a toxic substance. Further studies indicated that the disease occurred not only in turkeys but also in ducklings, chickens, pigs and cattle and that it was confined to animals whose diet contained groundnut meal. At first it appeared that only Brazilian groundnuts were implicated but it was later shown that samples from other parts of the world were occasionally toxic.

197. In the search for the source of the toxic substance in the groundnut meal such possibilities as contamination with seeds of poisonous plants; with chemical pesticides or fungicides; or with chemical solvents used in the processing of groundnuts were considered and eliminated. It was then found at Weybridge that in samples of toxic groundnuts a proportion of the kernels were invaded by fungal hyphae and that toxicity was confined to groundnuts which contained the fungal hyphae. Over 12 species of fungi were isolated from the toxic groundnuts by workers at the Tropical Products Institute and one isolate of *Aspergillus flavus* was found to produce an extremely toxic substance which when fed to ducklings in very small quantity produced the liver lesion characteristic of "X-disease". Work is continuing on the chemical composition of the toxin, tests for its detection, how and when the groundnuts become infected with the toxin-producing strain or strains of *Aspergillus flavus*, the minimum toxic dose of the substance and long term effects of feeding it in small quantities to laboratory rats, etc., etc.

198. The subject may have very wide implications but here our interest lies in its demonstration of the value of applying mycological techniques to the study of diseases of livestock of unknown aetiology. There are a number of quite important diseases of seasonal occurrence and associated with feeding on certain types of pasture the causes of which are unknown and which might prove to be caused by fungal toxins. Such conditions as "tembleque" in S. America, "rye-grass staggers", "phalaris staggers", "megrims in sheep on the Romney Marshes", some types of photosensitization and possibly chronic bovine haematuria, come to mind. A point of considerable importance which emerges from this work is that not all strains of a toxin-producing fungus are dangerous. *Aspergillus flavus*, the species which is implicated here, is a very common and widespread fungus but there are many strains of it which vary greatly in their ability to produce toxins. Indeed it appears that strains which can produce dangerous amounts of toxin are quite rare.

199. *Virology.* This continues to be a very active field. The technique for cultivating virus on various types of tissue cells in culture tubes is now very widely utilized. It has enabled virologists to isolate many hitherto unknown viruses from the respiratory and digestive tracts of animals. Many of the viruses so isolated have been designated "Orphan" viruses, that is viruses in search of a disease, because as yet they have not been associated with any specific disease. Fundamental work on the structure, composition and intracellular activity of the virus particle has greatly extended knowledge. The rôle of ribonucleic acid and desoxyribonucleic acid in the life cycle of viruses is being elucidated and light is being thrown on how viruses mutate and how the host range of a virus might be extended.

200. So far no antibiotic or chemotherapeutic substance having specific curative action in any of the diseases caused by the smaller viruses has been developed but increasing knowledge of the details of virus multiplication may lead to the discovery of some means whereby multiplication may be checked at one or other of its stages. Such substances as interferon are being closely studied and although as yet they play no part in actual treatment of disease their study is greatly extending knowledge of the mode of action of viruses. Cell culture methods are also being used in diagnosis of virus diseases, in surveys and have been of great value in fundamental immunological studies.

201. An interesting development in recent years has been the demonstration that some diseases not previously thought to be related in any way can be grouped together on the basis of immunological relationships between their causal viruses. For example it has been shown that the virus of rinderpest, a disease confined to ruminants and pigs, is related to that which causes distemper in dogs which, in its turn, has been shown to be related to that of measles in children. Another unexpected relationship is that between the virus which causes swine fever in pigs and viruses which cause mucosal disease in cattle.

202. These findings have given rise to much speculation on the origin of viruses causing disease in man and in animals and on possible applications as immunizing agents.

203. There has been great activity in the study of the influenza virus of man and the demonstration of certain types of the virus in horses, ducks and cattle may be of importance in determining the source of pandemic strains such for example as that of the so-called Asian flu.

204. An interesting and important advance in foot and mouth disease has been the development at Pirbright of live virus modified vaccines which have already been tested in field trials in Africa. A special laboratory for the large scale production of such vaccines has been built at Pirbright. These vaccines are not intended for use in the United Kingdom but for African and Asian countries where the disease is endemic and eradication by a slaughter policy is not feasible.

205. The danger of extension of virus diseases to countries far distant from the areas to which they have previously been confined has been rather dramatically demonstrated by the appearance of African Horse Sickness in India, Pakistan, Persia, Turkey and Cyprus, of African Swine Fever and of Bluetongue of sheep in Portugal and Spain.

206. Very heavy losses of horses and mules resulted from African Horse Sickness and were checked by widespread vaccination campaigns organized and subsidized by FAO

Vaccine was at first supplied from the Onderstepoort Laboratories in S. Africa and then by locally prepared vaccine when workers had been trained and supplied with the necessary equipment and materials by international co-operation organized by FAO and greatly assisted by the Onderstepoort workers.

207. The outbreaks of African Swine Fever in Portugal and Spain, in the absence of any known method of immunization, were dealt with by slaughter.

208. The outbreaks of Bluetongue in the same countries were dealt with by a combination of vaccination and slaughter and here too the Portuguese and Spanish authorities were greatly assisted by the Onderstepoort workers and by FAO

209. At the time of writing the situation in all these areas is promising and the great efforts made to contain these three very serious diseases seem to have good prospects of success.

210. The danger of introduction of exotic infectious diseases into hitherto exempt countries has been greatly increased by the modern developments in rapid transport over long distances. This poses a real problem particularly to countries such as Australia and New Zealand with their vital livestock industries and which have previously been protected by their geographical isolation.

211. *Diseases caused by helminths.* In this field the most interesting veterinary aspects have been the greatly increased studies of immunity; the continued development by chemists of new anthelmintics; and more precise knowledge of the ecology of certain worms particularly those causing parasitic gastro-enteritis in grazing animals.

212. In past years studies of the immunological aspects of helminth diseases have been meagre as compared with bacterial and virus diseases but recently there has been a very marked increase in interest. As was mentioned in these notes in 1959 a vaccine against lungworm infection of cattle was being developed in the Glasgow Veterinary School; this is now produced on a commercial scale and is quite widely used in Great Britain.

213. The importance of immunological reactions in the pathogenesis, symptomatology and control of these diseases is becoming appreciated and important contributions to knowledge have been made by workers in Australia and Great Britain.

214. The search for more efficient anthelmintics continues and many new substances have been developed by the chemists. Prominent among these are methyridine, thiabendazole, organophosphorus compounds and bephenium compounds, some of which have action against not only adult worms in the intestinal tract but also against the larval stages in the tissues; this is quite an important advance.

215. The ideal anthelmintic has been defined as one having the following properties: (a) cheapness, (b) non toxic to the host, (c) a wide range of activity against many species of parasitic helminths and (d) capable of eliminating 100% of the helminths by a single dose. It is of interest to note however that developing knowledge on the rôle of immunity in the diseases caused by helminths tends to throw some doubt on the wisdom of developing and using an anthelmintic which would destroy 100% of the worm burden. It could be that an anthelmintic which fell short of that ideal but which reduced the worm burden to non-injurious proportions and left sufficient worms to produce and maintain immunity, might be more valuable.

216. *Trypanosomiasis.* The present position of work on this important disease of livestock in Africa bears some resemblance to that on helminth diseases in as much as the search by chemists for improved chemotherapeutic agents continues and there is at the same time an increasing interest in the immunological aspects of the disease. New drugs continue to be produced and the problem of emergence of drug-resistant strains of trypanosomes is being actively studied. The difficulty occasioned by severe local reaction at the site of injection of long-acting drugs has not yet been surmounted. The most promising line of research at present seems to be concerned with the possibility of producing immunity by the judicious use of chemotherapeutic drugs to protect cattle and at the same time give them an opportunity to develop immunity or at least resistance to the strains of trypanosomes to which they are exposed.

Pastures and field crops

217. The population of the world has increased to such an extent that we have already reached the stage when, if all the world's food were equally divided amongst its people, all would go hungry. That being so, the most notable advances in agricultural research in recent years must be counted as those leading to increased yields of food per unit of land, whether through better varieties of field crops or pasture plants, better plant protection, better control of weeds, or by other means.

218. *Weed control.* The development of chemical methods of weed control is without doubt one of the most significant advances in agricultural progress in recent years. The enormous increase in the scientific literature on the subject bears witness to this. Results of recent experiments indicate that even the most troublesome of noxious weeds, such as wild oats, which are almost impossible to eradicate by cultivation, will be controlled by selective herbicides. Notable advances have also been made in the use of the so-called 'pre-emergent' herbicides which are applied to the soil before a field crop germinates, and in the use of herbicides for destroying aquatic weeds in paddy fields and irrigation canals.

219. *Improvement of grasslands by intersowing.* Considerable progress has been made in recent years with various techniques for intersowing (oversowing, sod sowing or surface seeding) depleted grasslands, a method which is a compromise between the very slow process of natural recovery by secondary succession and the complete, relatively quick establishment of sown pastures, after ploughing and cultivating the land. (*Herb. Abstr.* Vol. 30: 1447, 1450.)

220. *The renovation of inferior pastures using herbicides.* Chemical herbicides are being increasingly used experimentally to kill or suppress the vegetation of poor-quality pastures before oversowing them, without ploughing, with improved varieties of pasture plants. Until recently a combination of dalapon and 2, 4-D or aminotriazole has commonly been used for this purpose, but this remains toxic in the soil for 4 to 6 weeks and so delays oversowing. A new herbicide, paraquat, which is highly toxic to grasses, is completely inactivated on contact with the soil and so allows oversowing to be carried out almost immediately after a pasture receives herbicide treatment. The mulch formed by the dying grass appears to favour the development of the new grass seedlings. (*Herb. Abstr.* Vol. 31: 1501.)

221. *Grass and fire.* Until recently the usual attitude of scientists towards the annual

grass fires that occur in Africa and America was that they were wholly bad. A more recent inquiry into the subject has shown that fire is beneficial for some grasslands and that it is, in fact, the reason for their existence. Fire stimulates some grasses, it reduces competition from woody plants and it does not deplete the organic matter of the soil, as was at one time claimed. (*Herb. Abstr.* Vol. 30: 1851.)

222. *Herbage production from leys in the year of sowing.* In the past, relatively little information has been available on herbage production in the year of sowing. Such leys were usually undersown to a cereal companion crop, the reasoning being that the latter would carry the cost of establishing the ley, the yield of which in the year of sowing, it was assumed, was certain to be low in any case. More recent information goes to show that there is no need to accept this last assumption. Swards based on different herbage species and varieties show a wide range of growth during the time that they are establishing themselves, but experimental data show that high yields can be obtained in the year of sowing, provided that no companion crop is sown. The choice seems to be between the rapid production of dry-matter for early grazing or silage from a ley and its quick-growing companion cereal crop, or a much higher yield of good quality herbage in mid-season from a ley grown without a companion crop. (*Herb. Abstr.* Vol. 31, pp. 1–6.)

223. *The extension of the grazing season.* The extension, at each end, of the period during which grasses normally make active growth would be of great economic importance to farmers in Europe. The recent introduction into France and Britain of ecotypes of North African tall fescue, which under experimental conditions have proved capable of growing during winter, when native grasses are making little or no growth, indicate that before long it may be possible to extend the growing season of pastures in both countries. Some of these tall fescues have already been released in France for general distribution. One of them, Manade, a variety of Mediterranean origin, is 10 to 15 days earlier in flowering than the Aberystwyth cultivar S170 and if grazed early in spring, when its flowering apices are 3 to 4 inches high, it will later form a dense leafy sward. Experiments in Britain have shown that certain North African tall fescues are capable of assimilating carbon at a much higher rate during winter than S170. (Rep. on visit to N. France, 1961, by A. G. G. Hill; also *Expts. in Progress*, No. 13, Grassl. Res. Inst., Hurley.)

A plant-collecting expedition recently left Britain for Morocco and Tunisia with the main object of enlarging the range of tall fescue genotypes available in the United Kingdom where the limited number of North African ecotypes already examined show considerable promise as winter-growers.

224. *A toxic fungus of pastures.* Facial eczema, a disorder of sheep grazing on certain New Zealand pastures, which defied research workers for 50 years, has recently been shown to be caused by the spores of a saprophytic fungus, *Pithomyces chartarum* (syn. *Sporidesmium bakeri*) which invades the litter of pastures, given certain microclimatic conditions. The fungus has recently been found in Britain. (*Herb. Abstr.* Vol. 30: 598 *et seq*; Vol. 31: 184, 185.)

225. *Silage-making techniques.* Many of the problems associated with silage making still remain only partly solved, but as a result of recent experimental work certain

developments seem likely to be widely adopted. For instance, it seems unlikely that in future the old recommendation to promote a temperature rise to 90–100°F in the green material during silage making will be followed as it has been shown that there is no advantage in doing so. Continuous filling of the silo with herbage cut at the correct stage of growth, instead of filling it in layers and waiting for the mass to heat, allows a greater quantity of high quality herbage to be ensiled in a given time. Again, the importance of the dry-matter content of the herbage being ensiled has been demonstrated experimentally and the benefits of wilting herbage before it is ensiled are now recognised. (*Herb. Abstr.* Vol. 32: 770.)

Wilting, if followed by chopping or laceration, promises to be of real value in reducing losses and in improving silage quality. (*Herb. Abstr.* Vol. 30: 1068.)

226. *The use of epidermal characters to identify grasses in the leafy stage.* Progress has been made in the use of this technique so that it is now possible by examining certain characters of the leaf epidermis under the microscope to identify some agricultural grasses in their vegetative stage. (*Herb. Abstr.* Vol. 29: 1319.)

227. *New methods for measuring leaf area.* In one method the apparatus used consists of a perforated plate (600 holes/in.^{2}) mounted on an airtight suction pump. Leaves are sucked on to the perforated plate and the pressure in the drum decreases in proportion to the leaf area. The method is several times faster than blueprinting the leaves and then measuring the area with a planimeter and is said to be as accurate. In another method a leaf placed between a source of light and a photo-electric cell reduces the intensity of light falling on the cell so that as the size of leaf increases, the light intensity recorded by the cell diminishes. The method was designed for studying the effect of auxins and their inhibitors on plant growth, including leaf size. (*Fld. Crop Abstr.* Vol. 12: 1505; Vol. 13: 1426.)

228. *The use of controlled life-cycles in the forage grasses and legumes.* The development of the inflorescence in grasses and legumes is usually determined by response to local conditions of temperature and photoperiod. A knowledge of these environmental responses should make it possible to control the time and extent of flowering under glasshouse and laboratory conditions. Such control of flowering can be of much value in experimental work, e.g., in obtaining several generations in a year and in studying flowering requirements. This information can be used for the rapid classification and identification of varieties or for predicting flowering behaviour in different climates and latitudes. The techniques and equipment available for supplying these requirements, and their use in controlling life-cycles have advanced greatly in the last 3 years. (*Herb. Abstr.* Vol. 30, pp. 71–9.)

229. *The theory of obtaining high crop yields.* A long abstract on the stimulating theory of Ničiporovič on how to obtain high crop yields, followed by an independent commentary by two British scientists was published in *Fld. Crop Abstr.* Vol. 13, pp. 169–75. Ničiporovič examined the possibility of increasing the productivity of crops as an integrated problem in plant physiology, depending fundamentally on control of photosynthesis, rather than as a collection of separate agronomic problems. He distinguishes the attributes of the photosynthetic system of a crop that are important determinants of yield, attempts to assess their optimal values and finally makes estimates

of potential maximum yields from a theoretical consideration of the energy relations of photosynthesis, which imply that much higher net assimilation rates and yields should be possible than those now achieved.

230. His conclusions can be criticised in the light of later work, but they are valuable because they clearly set out the many components of the complex system involved in crop production and show that achievement of maximum yield depends not on improvements in a single component but on the control of the interaction between all of them.

231. *Crop production without tillage.* Results of recent trials, in which herbicides like atrazine were applied to a sod some time before sowing a cereal crop, ('chemical ploughing' or 'chemical fallowing'), suggest that with the development of improved selective herbicides it may soon be possible to raise cereals and other annual crops without the usual tillage operations to control weeds. (*Fld. Crop Abstr.* 15: 722.)

232. *Rice.* Increasing interest has been shown, particularly in India, in the possibility of improving rice yields by inoculating paddy fields with blue-green algae. These algae exercise the double role of fixing atmospheric nitrogen and liberating oxygen as a product of their photosynthesis. In field experiments, yield increases of up to 22% have been reported as a result of inoculating paddy fields with the blue-green alga *Tolypothrix tenuis.* (*Fld. Crop Abstr.* Vol. 14: 674.)

An interesting development in rice-growing in India is the attention being paid to research on deep-water paddy cultivation in multi-purpose reservoirs which are subject to considerable rises and falls in their water levels. Deep-water rice varieties have a rapid growth rate which enables them to keep pace with the rising water level, even to depths of about 15 ft. The crop may have to be harvested by boat. A distinction is drawn between flood rice, which is physiologically adapted to tolerate submergence for long periods, and deep-water rice, which grows taller as the water rises and develops adventitious roots at its nodes. (*Fld. Crop Abstr.* 14: 1702 and 15: 184.)

Fixation of nitrogen by the rice plant. Recent experiments with *Oryza sativa* indicate that the rice plant is able to synthesize elementary nitrogen under conditions of nitrogen starvation. (*Fld. Crop Abstr.* 13: 1711.)

233. *A perennial sorghum.* A variety of *Sorghum vulgare* has been found in India which, it is claimed, will produce perennial crops, provided that winter temperatures do not fall below 10°C. and summer temperatures do not rise above 40°C. (*Fld. Crop Abstr.* Vol. 13: 1143.)

234. *Witch-weed resistance in sorghums.* Varieties of *Sorghum vulgare* resistant to the root parasite *Striga lutea* are characterized by lack of a substance, excreted from the host-plant roots, which stimulates germination of the parasite's seed. Tests indicate that resistance is due to the interaction of an inhibitor with the stimulatory substance, the inhibitor being possibly a proteinaceous compound. This type of resistance differs from that in other sorghums in which mechanical and physiological obstruction in the host is the cause of reduced *Striga* attack. (*Fld. Crop Abstr.* 13: 639.)

235. *Irradiation of potatoes to control sprouting.* In Canada certain firms have been allowed to sell potatoes for human consumption which have been treated with low doses of irradiation to prevent sprouting. The authorities concerned are satisfied that no risk is involved to the consumer. A mobile trailer-mounted cobalt-60 gamma-radiation

device is expected to be in service for treating the current crop and the plans are to irradiate more than 500 tons of potatoes in the eastern province in co-operation with Atomic Energy of Canada's Commercial Products Division. (*Fld. Crop Abstr.* 15: 1188.)

236. *A non-shattering variety of sesame.* Of the annual oil-seed crops, *Sesamum indicum* is one of the most important, but because of its habit of shedding its seed, much of the crop is lost. Russian workers claim to have found a variety, "Slabo-osypajuščiisja 3", which is almost non-shattering and can be reaped by combine-harvester. (*Fld. Crop Abstr.* Vol. 13: 865.)

237. *The manatee as a weed controller.* Experiments in British Guiana have shown that it is possible to clear weeds from an irrigation canal by using manatees or sea cows. It is claimed that these mammals are preferable to chemical herbicides for this purpose. (*Fld. Crop Abstr.* 14: 929.)

238. *A germination inhibitor.* The seeds and husks of *Crambe tatarica* have been found to contain an interesting substance which inhibits the germination of the seeds of various plants. It is suggested that the biological role of the inhibitor is to maintain a period of dormancy in *Crambe* seeds and to provide room for its seedlings, by depressing growth of neighbouring plants. (*Fld. Crop Abstr.* Vol. 14: 390.) The substance might have valuable practical applications.

239. *A living insecticide.* A biological pest-control agent, thuricide, which is composed of living spores of *Bacillus thuringiensis*, is the first microbial agent to be produced on a large scale for the protection of food- and forage-crops. It is specific in its action on leaf-eating insects and has been successfully used against lucerne caterpillar, maize ear-worm, cotton leaf-perforator, cotton leaf-roller and cotton bollworm. (*Fld. Crop Abstr.* Vol. 12: 1643.)

240. *Air-tight storage of damp grain.* It has been shown that wheat can be stored in Britain for long periods in air-tight storage at moisture levels of up to approximately 19% and will make good bread, but at any level above 17% the grain develops a taint. It appears, therefore, that the practical usefulness of air-tight storage in Britain may be limited to the storage of grain for animal feed. (*Fld. Crop Abstr.* 12: 505.)

Plant breeding and genetics

241. A paradoxical situation has developed in mathematical genetics. The method of analysis of the genetics of quantitative characters based on partitioning of variance, introduced by Mather, has been extensively applied to a considerable range of economic species. However, it has become apparent that some of the inferences made in this analysis, especially the very low figures for number of effective factors, are quite unrealistic. Recently, as in an important paper by N. Gilbert, the assumptions underlying the analysis, in particular the confidence placed in scaling tests, have been shown to be inadequately established on mathematical grounds, and it appears that extreme caution is necessary in future work along these lines.

242. Progress has been made in the study of deoxyribonucleic acid (DNA), which is now considered by many investigators to be the compound responsible for the transmission of hereditary characters. The twin-spiral formula for DNA was proposed in

1953 by Watson and Crick (cf. *PBA* XXIV, 57–8). This formula, in which pairs of purine and pyrimidine bases occur in a fixed order characteristic of the genotype, opened up the possibility of discovering how the genetic information in the chromosome was transferred to the enzyme molecules that were thought to be immediately responsible for the metabolic processes involved in the normal development of the organism. It was postulated, and now appears to be confirmed, that particular sequences of base pairs in the DNA molecule corresponded to particular aminoacids in the enzyme protein molecule. It is now claimed that the "code" of equivalence between the base pairs and aminoacids has been broken and is a nonoverlapping triplet code, particular sequences of three base pairs corresponding to particular aminoacids. It would appear therefore that fundamental genetic research is likely to become biochemical in orientation and possibilities of chemical synthesis or modification of genotypes can be envisaged.

243. The school of genetical thought associated with the names of Michurin and Lysenko in Russia still seems to retain the ascendency, though in 1960 the USSR Academy of Sciences published a memorial volume in honour of the late N. I. Vavilov. In this connexion it is also interesting to note that in Czechoslovakia the Mendel Museum, which was closed in 1950, is being reopened and an international symposium to celebrate the publication of Mendel's work is planned for 1965.

Several authors, including some in the Soviet Union, have reported experiments which show that Lysenko's "conversions" of one form or species to another are in all probability the result of selection (cf. *PBA* XXXI, 4141).

244. The Russian experiences with perennial wheat hybrids referred to in paragraph 161 of the 30th Annual Report of CAB have been confirmed in the USA (cf. *PBA* XXIX, 2457).

245. Lively interest in the origins of cultivated plants has been aroused by some recent discoveries. One of these is of pollen identified as that of maize in deposits in Mexico dating back 80,000 years, from which it has been concluded that even at that early date the maize plant as we now know it was already in existence (cf. *PBA* XXIX, 1499). The study of a wheat species, *Triticum macha*, still growing in Transcaucasia and combining many of the characters of the primitive wild wheats with the same chromosome number as modern bread wheats has shed more light on the origin of this plant too (cf. *PBA* XXX, 2483, XXXI, 4468).

246. An increasing attention to the application of irradiation has been noted in the USSR (cf. *PBA* XXXII, 4) and elsewhere and both in the USSR and USA new scientific journals devoted exclusively to the results of such work have been initiated, in addition to an international journal for the same purpose. Studies of artificially induced mutation in Germany have shown surprising similarities between many of the mutants and certain forms already known in nature (cf. *PBA* XXX, 3452). A powerful new chemical mutagen, ethyl methanesulphonate, has been found in Sweden, its effects being not only more powerful but also more selective (cf. *PBA* XXXI, 1908). The list of useful mutants has been added to, though some may think not as quickly as might have been expected from claims made for the method. Some of these have now been withdrawn, since many of the rust-resistant oats found in irradiated populations have been shown to be the result of natural hybridization, the amount of which is increased by irradiation owing

to the male sterility that results from the treatment (cf. *PBA* XXX, 1472). The useful mutants that have been reported include a groundnut with thicker hulls, fewer damaged kernels and growth cracks, and greater resistance to leaf spot (cf. *PBA* XXX, 758, XXXI, 868). The Pallas barley, an X-ray mutant from Bonus, has been released; it excels its parent in straw strength, compactness of ear, grain length and response to fertilizers (cf. *PBA* XXIX, 3526). A mutant of Haisa barley obtained in Germany is said to be 3–4 days earlier, 6% higher in yield and better in quality (cf. *PBA* XXXI, 432). Early-maturing wheat mutants are reported from India (cf. *PBA* XXXI, 1412) and in the early-maturing tomato Potentate still earlier mutants have been induced (cf. *PBA* XXXI, 1034). Mutants with improved quality have been reported in Bright Yellow tobacco (cf. *PBA* XXX, 1175) and Elberta peach (cf. *PBA* XXX, 1910) and in Poland, poppy mutants containing 0.6% of morphine as against 0.32% in the initial strains are reported (cf. *PBA* XXXI, 5203).

Irradiation has been found effective in inducing sexual fertility in apomictic plants such as meadow grass (*Poa pratensis*) (cf. *PBA* XXXII, 1687). Another interesting result of radiation treatment of microorganisms was the production of a nutritionally deficient strain of the imperfect fungus *Fusarium oxysporum* from Britain which later produced fruiting bodies that enabled it to be identified (cf. *PBA* XXX, 2090, XXXI, 4036).

247. Efforts by Sears to locate genes for disease resistance on individual chromosomes or chromosomal segments have met with further success and he has now located a gene for resistance to wheat bunt (*Tilletia caries*) on chromosome XIII of wheat (cf. *PBA* XXXI, 33) and one for resistance to the rust *Puccinia recondita* on a small fragment of a chromosome of the grass *Aegilops umbellulata*; the fragment carrying this gene and little or nothing else has been transferred, by the use of the irradiation technique, to wheat plants (cf. *PBA* XXXII, 328).

248. The use of hybrids continues to extend, over 30% of the maize area in Italy being now occupied by hybrids. Arla, the Swedish hybrid cucumber, has given earlier and higher yields of larger fruit of better appearance (cf. *PBA* XXXI, 2704–5) and hybrid water melons in Russia have given yield increases of up to 44.3% (cf. *PBA* XXXII, 2590). Hybrid Sudan grass, produced by transferring the male sterility of Combine Kafir 60 (*Sorghum vulgare*) to Rhodesian Sudan grass (*S. arundinaceum*) has proved more productive than any other variety (cf. *PBA* XXXI, 1470). Hybrids between two species of bluestem, *Andropogon hallii* and *A. gerardi*, from different parts of the USA showed notable hybrid vigour, exceeding the average of the parent clones by 31% in forage quality, 20% in height of leafy growth, 9% in total height and 59% in forage yield (cf. *PBA* XXXII, 2041). Natural hybrids between two grass species, *Festuca pratensis* and *Lolium perenne*, have supplanted both species in a riverside meadow (cf. *PBA* XXXI, 5625). Claims have been made that the increased vigour associated with interspecific tobacco hybrids (*Nicotiana tabacum* x *N. rustica*) can be fixed by appropriate selection (cf. *PBA* XXXI, 1158). The dangers of the indiscriminate use of hybrids however are illustrated by the fate of hens fed in Germany on a diet in which the sole fluid consisted of wine made from European x American vine hybrids: after some months they suffered from liver disorders, while changes in the erythrocytes and blood composition occurred, whereas hens fed on proper wine, or even water, suffered no such effects (cf. *PBA* XXX, 3193).

249. Confirmation of the superiority of mixed races over genetically pure varieties comes from the USA in respect of resistance to stem rust and Hessian fly in barley (cf. *PBA* XXXI, 256) and mixed populations comprising 6,200 different spring barleys in the world collection have been made available as a source of breeding material to breeders throughout the world (cf. *PBA* XXXI, 1511). Further to this, 7,500 lines from the world barley collection have been crossed with a male-sterile line and the bulked progeny is being made available to breeders throughout the world. It is now planned to extend this scheme to wheat and oats too (cf. *PBA* XXXI, 3768, XXXII, 1646). The superiority of genetically complex populations over pure lines has been confirmed also with Lima beans in the USA (cf. *PBA* XXXI, 5548), for wheat in both the USA (cf. *PBA* XXXII, 162) and the Soviet Union (cf. *PBA* XXXII, 343) and for cotton in the USSR (cf. *PBA* XXXII, 2169). Mixtures of lines differing in chromosome number have shown superiority in experiments with timothy grass (*Phleum pratense*) in Sweden (cf. *PBA* XXXI, 227) and a synthetic population of red clover, produced in the USA and issued under the name Lakeland, has distinguished itself by high yield and resistance to powdery mildew (*Erysiphe polygoni*) and anthracnose (*Kabatiella caulivora*) (cf. *PBA* XXX, 2779, XXXII, 2058).

250. The list of useful polyploids continues to grow, one of the most striking examples being the artificial swede rape synthesized in Sweden by crossing the putative parent species, *Brassica napus* var. *oleifera* and *B. oleracea*, both having been previously subjected to chromosome duplication. The synthetic rape is said to be hardier than the varieties previously cultivated (cf. *PBA* XXXI, 223).

Among tetraploid derivatives obtained from a cross between *Sorghum vulgare* and the weakly rhizomatous *S. virgatum* were a number of plants showing strongly rhizomatous growth. The cytological behaviour of these tetraploids was shown to be identical to that of Johnson grass, *S. halepense*. It is suggested that Johnson grass arose as a result of the doubling of chromosomes of a natural hybrid between *S. vulgare* and *S. virgatum* in the Mediterranean region of North Africa (cf. XXXI, 556). A sterile triploid of Bermuda grass (*Cynodon dactylon*) registered in the USA produces fine-textured, dense turf and is tolerant of diseases (cf. *PBA* XXXII, 721). The superiority of polyploid clovers has been confirmed (cf. *PBA* XXXI, 1412, 4859); polyploids of water melon (cf. *PBA* XXXI, 1020) and a number of other plants have however been disappointing.

Further attention has also been given to the use of haploid plants produced by halving rather than doubling the chromosome number. Variability tests have shown that colchicine-doubled haploids are more uniform than ordinary open-pollinated varieties. Agronomic tests have indicated that the best doubled haploids of American Upland cotton equal commercial varieties in lint quality and yield and do not necessarily have narrow ranges of adaptation. Doubled haploids are being used as recurrent parents in interspecific transferences. They also hold promise as an aid in the purification and maintenance of commercial varieties. Doubled haploids and their derivatives would be valuable as parents in the production of F_1 hybrids (cf. *PBA* XXXI, 2275).

FINANCE

251. The Comptroller and Auditor General has audited the accounts of the Bureaux, the Institute of Entomology and the Mycological Institute for 1961/62 and the account of the Institute of Biological Control for 1960/61. These accounts are attached to this report. The position as regards contributions on 31st March, 1962, was as follows:

(1)	Contributions due in 1961/62 (2)	Outstanding on 31.3.61 (3)	Total due (4)	Outstanding on 31.3.62 (5)	Total received in 1961/62 (6)
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Bureaux	163,314 0 0	5,775 10 0	169,089 10 0	17,679 1 0	151,410 9 0
Institute of Entomology	47,475 0 0	1,636 2 0	49,111 2 0	5,141 6 0	43,969 16 0
Mycological Institute	41,778 0 0	1,438 17 0	43,216 17 0	4,521 15 0	38,695 2 0

NOTES: (i) The figures in column (2) are those recommended by the Review Conference 1955 (page 48 of the report).

(ii) An advance of £4,778 against Ghana's contribution for 1962/63 was received during the year and therefore the figures for receipts in column (6) are less than the figures shown in the audited accounts on pages 65 to 67 by Bureaux (£3,067), Institute of Entomology (£944) and Mycological Institute (£767).

(iii) The outstandings in column (5) were from Pakistan £4,389, Malaya, £5,348. 9s. 0d., Dependent Territories £2,903. 12s. 0d. and £14,701. 1s. 0d. due to the withdrawal of South Africa and Cyprus. Since the close of the year the contributions from Pakistan and Malaya and £1,335. 1s. 0d. from the Dependent Territories has been received.

(iv) The shortfall in contributions to the three funds for 1961/62 as a result of the withdrawal of South Africa from 1st June, 1961 and Cyprus from 1st April, 1961, was £17,763. 1s. 0d. but contributions of £2,598 from Australia, £314 from Ghana and £150 from Canada were received in 1961/62 against this deficit.

252. Commonwealth Institute of Biological Control.

The audited account for the Institute of Biological Control attached to this report relates to the year 1960/61. The position as regards contributions at 31st March, 1961, was as follows:

	£	s.	d.
Amount due in respect of 1960/61	43,044	0	0
Add arrears outstanding on 31st March, 1960	764	16	0
	43,808	16	0
Deduct arrears outstanding on 31st March, 1961	1,482	11	0
Contributions received during year	43,326	5	0

The outstanding amount on 31st March, 1961 has since been paid.

NOTE: The figure of £42,326. 5s. 0d. agrees with the amount shown in the audited account on page 68.

253. The total expenditure between the Bureaux, Secretariat and Central Sales was as follows:

Commonwealth Bureaux:

	£	s.	d.
Animal Breeding and Genetics (Edinburgh)	19,040	4	8
Animal Health (Weybridge)	25,681	2	3
Animal Nutrition (Aberdeen)	19,482	1	7
Dairy Science and Technology (Shinfield)	19,663	18	6
Forestry (Oxford)	27,375	3	11
Helminthology (St. Albans)	19,054	4	7
Horticulture and Plantation Crops (East Malling)	26,116	13	10
Pastures and Field Crops (Hurley)	23,955	2	11
Plant Breeding and Genetics (Cambridge)	21,965	5	4
Soils (Harpenden)	22,478	19	7
Secretariat	19,666	15	0
Central Sales...	17,884	3	4
Contribution to National Institute of Agricultural Engineering (Silsoe)	5,000	0	0
Contribution to World Agricultural Economics and Rural Sociology Abstracts	1,000	0	0
	268,363	15	6

To make the expenditure of the Bureau of Animal Nutrition comparable with all the other figures, a sum of £13,468. 14s. 10d. should be added to £19,482. 1s. 7d. making £32,950. 16s. 5d. This amount of £13,468. 14s. 10d. is taken from the separate audited account for *Nutrition Abstracts and Reviews* and is the total of printing, distribution, administration and extra staff costs. These costs are included in the totals for other bureaux shown in the above table.

SANCTIONED STAFF

By Grades: Ten Bureaux, Headquarters and Central Sales

Secretary	Assistant Secretary	Directors	Assistant Directors	Scientific Information Officers	Executive Assistants	Indexers	Senior Clerical	Clerical & Typing
1 (1)	1 (1)	10 (10)	10 (10)	57½ (55)	3 (—)	10½ (9)	11 (15)	63½ (60)

Institutes

	Director	Assistant Director	Scientists		Executive Assistants	Preparators etc.		
			A/B	C		D	E	F/Clerical & Typing
Entomology	1 (1)	1 (1)	16 (15)	13 (13)	—	6 (9)	6 (3)	7 (7)
Mycology	1 (1)	1 (—)	12 (13½)	7 (10)	1 (—)	2 (1)	9 (10)	18 (19)

	Director	Assistant Director	Senior Entomologist	Scientists			Librarian	Clerical & Typing
				A	B	C		
Biological Control	1 (1)	— (1)	2 (1)	1 (5)	5 (2)	4 (5)	1 (1)	10 (3)

Figures in parentheses are those recommended by the 1955 Review Conference, see page 50 of the Report. This staff was not necessarily to be worked up to at the beginning of the quinquennium.

Consultant Directors are not included.

THE EXECUTIVE COUNCIL OF THE COMMONWEALTH AGRICULTURAL BUREAUX
ACCOUNT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31ST MARCH, 1962

RECEIPTS

	£ s. d.	£ s. d.
Contributions from Commonwealth and other participating Governments for:		
Commonwealth Agricultural Bureaux	154,477 9 0	
Various Institutes	118,100 11 0	
	272,578 0 0	
Less: Paid over to Institutes	118,100 11 0	
		154,477 9 0
Sale of publications		67,910 6 6
Reprinting for Institutes, etc.		427 4 9
Contributions from Institutes towards cost of Headquarters		3,000 0 0
Miscellaneous receipts:		
Dividends and interest	3,871 17 4	
Other receipts	739 7 8	
		4,611 5 0
		230,426 5 3
Balance at 1st April, 1961		50,871 0 6
		281,297 5 9

PAYMENTS

	£ s. d.	£ s. d.
Secretary's and Assistant Secretary's salaries		6,827 16 0
Consultant Director's honoraria		1,006 5 0
Directors' and Assistant Directors' salaries		45,499 1 11
Scientific Information Officers' salaries		68,490 19 1
Clerical and Technical staff		52,839 1 11
National Insurance and Graduated Pension Scheme		4,669 8 8
Superannuation		15,390 7 5
Supplementation of superannuation and increases in pensions		1,457 15 0
Travelling expenses		2,034 14 8
Books, periodicals, etc		2,339 5 10
Printing of publications		43,007 11 3
Stationery, postage, telephones, etc.		7,542 16 6
Rent, maintenance, etc		6,187 7 11
Contribution to National Institute of Agricultural Engineering		5,000 0 0
Grant to World Agricultural Economics and Rural Sociology Abstracts		1,000 0 0
Accounting charges and audit fee		2,350 0 0
Miscellaneous expenses		803 10 6
Furniture and equipment		1,349 1 2
Visits Overseas (outside Europe)		532 12 6
Review Conference		36 0 2
		268,363 15 6
Balances at 31st March, 1962:		
H.M. Paymaster General	7,056 16 8	
National Provincial Bank (Deposit Account)	2,837 18 4	
Sub-Accountants and suspense	3,038 15 3	
		12,933 10 3
		281,297 5 9

(Signed) F. H. DAVEY,
Accountant to Council.

(Signed) T. V. SCRIVENOR, Secretary,
Executive Council, Commonwealth
Agricultural Bureaux.

I have examined the above Account. I have obtained all the information and explanations that I have required, and I certify, as the result of my audit, that in my opinion the above account is correct.

(Signed) E. G. COMPTON,
Comptroller and Auditor-General.

Exchequer and Audit Department,
13*th September*, 1962.

Investments at 31st March, 1962:

£		Cost £ s. d.	Market value at 31st March, 1962 £ s. d.
2,000	Commonwealth of Australia 4% Stock, 1955/70	1,940 4 0	1,690 0 0
	Cheshire County Council loans:		
25,000	to 25th April, 1962 at 5¼%	25,000 0 0	25,000 0 0
17,000	to 4th June, 1962 at 5¼%	17,000 0 0	17,000 0 0
		43,940 4 0	43,690 0 0

COMMONWEALTH INSTITUTE OF ENTOMOLOGY
ACCOUNT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31ST MARCH, 1962

RECEIPTS

	£ s. d.	£ s. d.
Contributions:		
Commonwealth and other participating Governments	44,913 16 0	
Other contributors	800 0 0	
		45,713 16 0
Sale of publications		18,467 12 9
Dividends and interest		1,083 10 1
Administration Fees and Agency charges:		
Pool of Entomologists	200 0 0	
Termite Research Unit	75 0 0	
African Phyto-sanitary Commission	1,750 0 0	
		2,025 0 0
		67,289 18 10
Sale of Securities:		
£ s. d.		
2,679 19 0 Funding Loan 4% Stock 1960/90	2,381 16 1	
1,000 0 0 Nigeria 4% Stock 1963	954 18 5	
		3,336 14 6
Balance at 1st April, 1961		13,914 9 10
		84,541 3 2

PAYMENTS

	£ s. d.	£ s. d.
Directors' salaries		6,010 0 0
Scientific Information Officer's salaries		37,986 11 11
Clerical and Technical staff		12,528 1 6
National Insurance and Graduated Pension Scheme		1,397 12 6
Superannuation		5,407 1 6
Supplementation of Superannuation and increases in pensions		1,380 1 0
Travelling expenses		72 0 7
Books, periodicals, etc.		481 18 6
Printing of publications		8,833 2 9
Stationery, postage, telephones, etc.		1,071 18 8
Rates, insurance, maintenance, etc.		415 8 8
Lighting, heating, water, cleaning, etc.		522 7 3
Contribution to Headquarters, accounting charges and audit fee		1,633 16 4
Grant to Bee Research Association		1,500 0 0
Miscellaneous expenses		184 17 4
Furniture and equipment		141 5 9
Visits Overseas (Outside Europe)		33 16 6
		79,600 0 9
Balances at 31st March, 1962:		
Crown Agents for Oversea Governments and Administrations	490 11 10	
Bank, petty cash and stamps	39 18 2	
Joint Consolidated Fund	3,000 0 0	
F.S.S.U. and Miscellaneous Suspense	1,410 12 5	
		4,941 2 5
		84,541 3 2

Investments at 31st March, 1962:

£ s. d.		Cost £ s. d.	Market value at 31st March, 1962 £ s. d.
1,000 0 0	Cyprus 4% Stock 1956/66	950 0 0	860 0 0
1,017 16 8	Kenya 4½% Stock 1961/71	998 15 0	687 0 9
951 1 10	Savings 3% Bonds 1960/70	1,040 5 2	760 17 6
3,000 0 0	N. Rhodesia 3% Stock 1963/65	2,911 1 7	2,460 0 0
2,060 17 1	Savings 3% Bonds 1955/65	2,126 15 1	1,926 18 0
1,013 18 2	Nyasaland 4½% Stock 1971/78	1,000 13 3	557 13 0
		9,027 10 1	7,252 9 3

(Signed) F. H. DAVEY,
Accountant to Council.

(Signed) T. V. SCRIVENOR, Secretary,
Executive Council, Commonwealth Agricultural Bureaux.

I have examined the above Account. I have obtained all the information and explanations that I have required, and I certify, as the result of my audit, that in my opinion the above account is correct.

(Signed) E. G. COMPTON,
Comptroller and Auditor-General.

Exchequer and Audit Department,
27*th September*, 1962.

(Signed) E. O. PEARSON,
Director.

COMMONWEALTH MYCOLOGICAL INSTITUTE

ACCOUNT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31st MARCH, 1962

RECEIPTS

	£ s. d.	£ s. d.
Contributions:		
Commonwealth and other participating Governments	39,462 2 0	
Other contributors	100 0 0	
		39,562 2 0
Sale of publications		14,855 11 1
Sale of cultures		2,151 17 8
Rent of acquired property		1,184 2 3
Dividends and interest		1,119 9 4
Administration Fees and Agency charges:		
Department of Scientific and Industrial Research	5,593 6 8	
Pool of Plant Pathologists	631 4 10	
African Phyto-sanitary Commission	1,750 0 0	
		7,974 11 6
		66,847 13 10
Instalment of Contribution towards cost of building completed in 1955		51 0 0
Repayment of Loan:		
Slough Borough Council		15,000 0 0
Balance at 1st April, 1961		5,497 15 3
		87,396 9 1

PAYMENTS

	£ s. d.	£ s. d.
Directors' salaries		5,872 15 5
Scientific Information Officers' salaries		24,840 6 2
Clerical and Technical staff		18,117 7 4
National Insurance and Graduated Pension Scheme		1,456 1 10
Superannuation		4,368 12 8
Supplementation of Superannuation and increases in pensions		789 16 1
Travelling expenses		247 3 5
Books, periodicals, etc		451 7 10
Printing of publications		7,487 2 9
Stationery, postage, telephones, etc.		850 3 8
Rent, rates, insurance, maintenance, etc		1,590 7 3
Lighting, heating, water, cleaning, etc.		2,466 12 8
Contribution to Headquarters, accounting charges and audit fee		1,529 13 11
Miscellaneous expenses		128 1 2
Furniture and equipment		2,320 15 2
Visits Overseas (Outside Europe)		67 8 8
		72,583 16 0
Balances at 31st March, 1962:		
Crown Agents for Oversea Governments and Administrations	598 10 4	
Bank, petty cash and stamps	276 0 11	
Joint Consolidated Fund	13,000 0 0	
F.S.S.U. and Miscellaneous Suspense	938 1 10	
		14,812 13 1
		87,396 9 1

Investments at 31st March, 1962:

£ s. d.		Cost £ s. d.	Market value at 31st March, 1962 £ s. d.
2,077 15 4	New Zealand 3½% Stock, 1960/64	2,077 15 4	1,973 17 7

(Signed) F. H. DAVEY,
Accountant to Council.

(Signed) T. V. SCRIVENOR, Secretary,
Executive Council, Commonwealth Agricultural Bureaux.

I have examined the above Account. I have obtained all the information and explanations that I have required, and I certify, as the result of my audit, that in my opinion the above account is correct.

(Signed) E. G. COMPTON,
Comptroller and Auditor-General.

Exchequer and Audit Department,
23*rd August*, 1962.

(Signed) J. C. HOPKINS,
Director.

COMMONWEALTH INSTITUTE OF BIOLOGICAL CONTROL
ACCOUNT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31ST MARCH, 1961

RECEIPTS		CANADA $ c.	CANADA £ s. d.	UNITED KINGDOM £ s. d.	TOTAL £ s. d.
Contributions from Commonwealth and other Governments		19,448 00	7,072 0 0	35,254 5 0	42,326 5 0
Sale of Publications		584 59	214 16 11	182 2 4	396 19 3
Interest					
General Account				1,186 16 11	1,186 16 11
Capital Account				544 16 5	544 16 5
Income from levy on special projects:					
(a) Overheads	$9,089·44				
(b) Use of official cars	$8,007·77				
		17,097 21	6,283 8 7		6,283 8 7
Miscellaneous receipts		1,406 40	516 17 5		516 17 5
		38,536 20	14,087 2 11	37,168 0 8	51,255 3 7
Remittances from the United Kingdom		81,884 37	30,000 0 0		30,000 0 0
Special projects:					
Receipts from sponsors	$111,141·24				
Less: allocated above	$ 17,097·21	94,044 03	34,562 6 1		34,562 6 1
Repayment of Loan:					
Slough Borough Council				8,000 0 0	8,000 0 0

PAYMENTS	CANADA $ c.	CANADA £ s. d.	UNITED KINGDOM £ s. d.	TOTAL £ s. d.
Director's Salary	9,856 22	3,622 5 7	192 2 9	3,814 8 4
Superannuation			388 17 9	388 17 9
Entomologists' Salaries	52,975 50	19,469 2 7	1,082 0 4	20,551 2 11
Superannuation			2,056 6 0	2,056 6 0
Clerical and Technical Staff Salaries	18,473 78	6,789 6 8	101 14 6	6,891 1 2
Superannuation	48 37	17 15 6	156 13 4	174 8 10
Supplementation of Superannuation and increases in pensions	480 00	176 8 1		176 8 1
Travelling expenses	1,330 35	488 18 5		488 18 5
Official cars: running expenses	7,210 55	2,649 19 3		2,649 19 3
Books, periodicals, etc.	1,437 04	528 2 7		528 2 7
Issue bulletins and periodical publications	25 17	9 5 0	1,016 12 7	1,025 17 7
Freight and postage	3,844 63	1,412 18 11		1,412 18 11
Rent, Maintenance, etc:				
Headquarters, Ottawa	108 93	40 0 8		40 0 8
Field Stations	6,104 28	2,243 7 11		2,243 7 11
Contribution to Headquarters, accounting charges and audit fee			1,100 11 5	1,100 11 5
Miscellaneous expenses	68 75	25 5 4	3 12 3	28 17 7
Furniture and equipment	5,427 18	1,994 11 1		1,994 11 1
Visits Overseas	1,893 60	695 18 5		695 18 5
	109,284 35	40,163 6 0	6,098 10 11	46,261 16 11
Remittances to Canada			30,000 0 0	30,000 0 0
Exchange difference on revaluation of dollar balances at 31st March, 1961		342 16 1		342 16 1
Expenditure on special projects	81,244 69	29,858 7 11		29,858 7 11
Loans:				
Cheshire County Council			8,000 0 0	8,000 0 0

Balance at 1st April, 1960 .	.	32,771	81	12,205	10	4	25,209	2	5	37,414	12	9
		247,236	41	90,854	19	4	70,377	3	1	161,232	2	5

Balances at 31st March, 1961												
United Kingdom:	£	s.	d.									
Crown Agents for Oversea Governments and Administrations	462	19	9									
Joint Consolidated Fund	24,000	0	0									
Post Office Savings Bank (capital account)	1,447	15	1									
F.S.S.U. Suspense	367	17	4							26,278	12	2
										26,278	12	2
Canada:	$	c.										
Sundry imprests	27,851	06										
Treasury	28,644	38										
Miscellaneous Suspense	211	93										
				56,707	37		20,490	9	4			
										20,490	9	4
				247,236	41		90,854	19	4	70,377	3	1
										161,232	2	5

Investments at 31st March, 1961:

	Cost £	s.	d.	*Market value at 31st March*, 1961 £	s.	d.
£8000 Cheshire County Council loan to 4th June, 1962 @ 5¾% .	8,000	0	0	8,000	0	0

NOTE: The closing balance in Canada shown above includes an unexpended balance of $34,092·35 of advances received from sponsors for special projects: expenditure on other projects not yet recovered amounts to $8,019·08.
Net expenditure of $7·45 has been written off as irrecoverable.

(Signed) F. H. DAVEY,
Accountant to Council.

(Signed) F. J. SIMMONDS,
Director.

I have examined the above Account. I have obtained all the information and explanations that I have required, and I certify, as the result of my audit, that in my opinion the above account is correct.

(Signed) E. G. COMPTON,
Comptroller and Auditor-General.

Exchequer and Audit Department,
10*th July*, 1962.

(Signed) T. V. SCRIVENOR, Secretary, Executive Council,
Commonwealth Agricultural Bureaux.

LIAISON OFFICERS

UNITED KINGDOM	W. E. Berry, B.Sc., Ph.D., Agricultural Research Council, Cunard Building, 15 Regent Street, London, S.W.1.
CANADA	G. M. Carman, B.S.A., M.Sc., Ph.D., Chief, Scientific Information Section, Research Branch, Department of Agriculture, Central Exp. Farm, Ottawa, Ontario, Canada.
AUSTRALIA	W. Ives, M.Ec., Associate Member of the Executive, Commonwealth Scientific and Industrial Research Organization, 314, Albert Street, East Melbourne, C.2. Victoria, Australia.
NEW ZEALAND	I. L. Baumgart, B.A., B.Sc., Department of Scientific and Industrial Research, P.O. Box 8018, Government Buildings, Wellington, C.1, New Zealand.
INDIA	A. D. Pandit, I.C.S., Special Secretary, Ministry of Food and Agriculture, Dept. of Agriculture, New Delhi, India.
PAKISTAN	Taskhir Ahmad, T.Pk., Ph.D. (Cantab.), Director, Department of Plant Protection, Ministry of Food and Agriculture, Jinnah Avenue, Malir Halt, Karachi, Pakistan.
CEYLON	R. W. Wikramanayake, C.C.S., Assistant Secretary to Government, Ministry of Agriculture, Lands, Irrigation & Power, Galle Face Secretariat, Colombo 1, Ceylon.
GHANA	Principal Secretary, Ministry of Agriculture, P.O. Box M.37, Ministry Branch Post Office, Accra, Ghana.

FEDERATION OF MALAYA	Permanent Secretary to the Ministry of Agriculture and Co-operatives, Federation of Malaya, Swettenham Road, Kuala Lumpur, Malaya.
FEDERATION OF NIGERIA	Director of Agricultural Research, Department of Agricultural Research, Moor Plantation, Ibadan, Nigeria.
SIERRA LEONE	Principal Agricultural Officer (Research), Agricultural Department, Njala, Sierra Leone.
TANGANYIKA	A. C. Evans, B.Sc., Ph.D., D.I.C. Director of Research, Ministry of Agriculture, Dar-es-Salaam, Tanganyika.
FEDERATION OF RHODESIA AND NYASALAND	G. R. Bates, Ph.D. (London), Chief Botanist and Plant Pathologist, Department of Research and Specialist Services, P.O. Box 8100, Causeway, Salisbury, Southern Rhodesia.
DEPENDENT TERRITORIES	Sir Geoffrey Nye, K.C.M.G., O.B.E., B.Sc. (Agr.), C.D.A., Agricultural Adviser to the Secretary for Technical Co-operation. Sanctuary Buildings, Gt. Smith Street, London, S.W.1.
REPUBLIC OF THE SUDAN*	Chief, Agricultural Research Division, Ministry of Agriculture, Gezira Research Farm, Wad Medani, Republic of the Sudan.
REPUBLIC OF IRELAND	M. O'Doherty, Department of Agriculture (Economics Division), Dublin, Republic of Ireland.

* The Government of the Sudan has since announced its withdrawal from CAB with effect from 31st March, 1962.

ADDRESSES

The Executive Council,
Farnham House, Farnham Royal,
Bucks.,
Telephone: Farnham Common 781
Secretary: Sir Thomas Scrivenor, C.M.G.,
Assistant Secretary: E. L. Hay, O.B.E.

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Commonwealth Mycological Institute,
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Director: J. C. F. Hopkins, C.M.G., D.Sc., A.I.C.T.A.
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Commonwealth Institute of Entomology,
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Commonwealth Institute of Biological Control,
Faculty of Agriculture (I.C.T.A.)
University of the West Indies,
St. Augustine, Trinidad, W.I.
Director: F. J. Simmonds, M.A., Ph.D., D.Sc.

THE COMMONWEALTH AGRICULTURAL BUREAUX

Commonwealth Bureau of	*Consultant Director*	*Director*
Animal Breeding and Genetics— Institute of Animal Genetics, The King's Buildings, West Mains Road, Edinburgh, Scotland. Tel.: Newington 1535	Prof. C. H. Waddington, C.B.E., Sc.D., F.R.S.	J. P. Maule, M.A., Dip. Agric. (Cantab.), A.I.C.T.A., F.R.S.E.
Animal Health— Central Veterinary Laboratory, New Haw, Weybridge, Surrey. Tel.: Byfleet 42826	A. W. Stableforth, C.B., D.Sc., M.R.C.V.S., D.V.S.M.	M. Crawford, M.R.C.V.S.
Animal Nutrition— Rowett Research Institute, Bucksburn, Aberdeen, Scotland. Tel.: Bucksburn 162	D. P. Cuthbertson, C.B.E., M.D., D.Sc., Hon. D.Sc. (Rutgers), LL.D., F.R.S.E.	D. Harvey, M.A., B.Sc., Ph.D.

Commonwealth Bureau of	*Consultant Director*	*Director*
Dairy Science and Technology— National Institute for Research in Dairying, Shinfield, Reading, Berks.	Prof. R. G. Baskett, O.B.E., M.Sc., F.R.I.C.	E. J. Mann, N.D.D., C.D.D.
Forestry— Commonwealth Forestry Institute, Oxford. Tel.: Oxford 57185	Prof. M. V. Laurie, O.B.E., M.A.	F. C. Ford Robertson, O.B.E., M.A., B.Sc.
Helminthology— The White House, 103 St. Peter's Street, St. Albans, Herts. Tel.: St. Albans 52126	Prof. B. G. Peters, M.Sc., Ph.D., Hon. A.R.C.S.	Miss S. M. Willmott, Ph. D.
Horticulture and Plantation Crops— East Malling Research Station, East Malling, Kent. Tel.: West Malling 3033	F. R. Tubbs, C.B.E., M.Sc., Ph.D., A.R.C.S., D.I.C., F.L.S.	G. K. Argles, Dip. Hort. (Wye), A.I.C.T.A.
Pastures and Field Crops— Hurley, nr. Maidenhead, Berks. Tel.: Hurley 363	William Davies, D.Sc.	A. G. G. Hill, B.A., Agr.B., B.Sc.
Plant Breeding and Genetics— School of Agriculture, Cambridge. Tel.: Cambridge 58381, Ext. 63.	Prof. Sir Joseph B. Hutchinson, C.M.G., Sc.D., F.R.S.	P. S. Hudson, O.B.E., Ph.D.
Soils— Rothamsted Experimental Station, Harpenden, Herts. Tel.: Harpenden 4671	F. C. Bawden, M.A., F.R.S.	G. V. Jacks, M.A.

APPENDIX I

History

THE Imperial Agricultural Research Conference, 1927, stressed (*a*) the need for scientists to be in touch with the progress of research throughout the world in their several branches, and (*b*) the difficulty therein owing to the great output of scientific literature and the diversity of languages in which it is published.

2. It recommended the governments of the British Commonwealth to establish on a joint co-operative basis eight bureaux to collect, collate and disseminate information on research in eight selected branches of agricultural science, and generally to assist research workers in the Commonwealth and Empire with information relevant to their subjects. Each bureau was to be located at a research institute specializing in its own branch of science so that the bureau officers should be in daily contact with men engaged on research in its own subject. These bureaux were to be financed from a common fund contributed by Commonwealth governments in agreed proportions and controlled by a Council composed of representatives of those governments on an equal footing.

3. Governments accepted these proposals. In November, 1928, a new type of inter-imperial co-operative agency acceptable to all governments was worked out in detail. On 1st April, 1929, the Executive Council of the Imperial Agricultural Bureaux came into being. The eight bureaux started work in that year. From 1st January, 1948, the name of the organization was changed to Commonwealth Agricultural Bureaux.

4. Following the Ottawa Conference of 1932, the work of several inter-imperial agencies was examined and reported upon by the Imperial Committee on Economic Consultation and Co-operation (1933). This committee approved of the bureaux organization and of its work and extended the duties of the Council, inter alia, proposing that with effect from 1st October, 1933, they should also be responsible for the supervision and administration and finance of the Imperial Institute of Entomology and of the Imperial Mycological Institute.

5. It also enunciated certain general principles to be observed in regard to the organization of agencies of inter-imperial co-operation and consultation, e.g., constitutional equality of participating governments in the appointment of the authority administering the work; the provision of adequate finance for a definite period of years; careful and periodical examination of the work and organization of the agency at the Commonwealth conferences suitable for the purpose, as without that assurance governments could hardly be expected to provide the adequate continuing finance; and the responsibility of the administering authority to all participating governments. All governments accepted this report.

6. The British Commonwealth Scientific Conference (1936) conducted the first of these 'periodical examinations'. It approved both the work and organization. It recommended the finance necessary until 1941/42 (extended later to cover the war period), its distribution between governments, also the formation of two more bureaux, and certain

modifications in practice designed to improve general efficiency. Governments accepted these proposals.

7. A Review Conference was held in the summer of 1946, just one year after the close of the war. This was the first since 1936 and was only the second "periodical examination" since the recommendations of the Imperial Committee on Economic Consultation and Co-operation in 1933. The Review Conference, 1946, recommended that the Parasite Service should continue to be located at Belleville, Canada, that it should become an individual bureau and that its name should be changed to the Bureau (now Institute) of Biological Control to denote its separate entity. It also recommended that information on general husbandry should be provided within the framework of the existing bureaux which, in turn, necessitated the name of the Bureau of Pastures and Forage Crops being altered to Pastures and Field Crops. Both changes of name were made on 1st April, 1947, the opening date of the period to which the recommendations of the conference referred. It recommended the finance necessary until 1951/52 and its distribution between governments. Governments accepted these proposals.

8. The third periodical examination took place in June and July, 1950. With such a well-established organization as this had now become, the conference was naturally concerned more with consolidation than with new developments. It did, however, lay stress on the need to continue the service; the mutual advantage of co-operation with international bodies, especially to avoid duplication of work; the possibility of foreign governments being associated with CAB; and the desirability of extending the services of the Institute of Biological Control to foreign countries. It also approved the use of Farnham House for the accommodation of Headquarters and Central Sales, advised the formation of the Consultant Directors into a Scientific Advisory Committee, approved the handing over of the Potato Collection to the Agricultural Research Council of the United Kingdom and provided funds to set up a new Bureau of Agricultural Economics though, for various reasons, the setting up of this bureau was deferred.

9. A further Review Conference was held in London in the summer of 1955. The Conference endorsed certain recommendations of the 1950 Conference, particularly in regard to co-operation with international bodies and association of foreign governments with the work of the Commonwealth Agricultural Bureaux, and modified others in the light of experience gained. The Conference suggested changing the name of the Bureau of Agricultural Parasitology (Helminthology) to Helminthology, of the Bureau of Dairy Science to Dairy Science and Technology and of the Bureau of Soil Science to Soils. It advocated increased superannuation benefits for CAB staff, improved salaries for Assistant Directors, provision for taxonomic and identification services in helminthology and coverage of literature on weed control. It deferred action on matters like the proposed Bureau of Agricultural Economics and the establishment of a laboratory of the Institute of Biological Control in East Africa but recommended a grant towards the journal of The National Institute of Agricultural Engineering pending a decision on the proposed Bureau of Agricultural Engineering at the next Conference. Finally, it recommended the finance needed till 1961/62 but called for a re-examination of the allocation of units of contribution to the CAB Organization.

10. The last Review Conference was held in the autumn of 1960. A section of the report deals with action on the recommendations of this conference but it is worthwhile recording here the opening recommendation which reiterated the words of the 1955 Conference thus:

"(1) The Conference is firmly persuaded, as a result of the inspections and discussions which have taken place during its progress, that the Commonwealth Agricultural Bureaux Organization provides an information service on scientific work in agriculture and forestry throughout the world which is of vital importance for agricultural development and thus for the production of food and the maintenance of living standards; that such a comprehensive service is not provided anywhere else and could not be provided by either national or international organizations so cheaply or so efficiently; and that the cost of the service is very small in relation to the value of agricultural and forestry production in the contributing countries."

11. The CAB Review Conference 1960 endeavoured to frame recommendations which would not only ensure the full and efficient maintenance of existing services and provide for a very small degree of expansion, but would also leave the door open for further enlargement of the field of activities at a later date. The keynote of the Conference was the careful reappraisal of CAB activities, with due regard to the primary purposes for which the organization was set up. The Conference instituted inquiries both into the techniques of preparing the abstracts and into the production, publication and sales of the abstract journals. In view of the need for economy, no new bureaux were to be opened but the grants already being given to *World Agricultural Economics and Rural Sociology Abstracts* and *Agricultural and Horticultural Engineering Abstracts* were to be increased and a small grant also made for the continuance of *Apicultural Abstracts*. One of the conditions attaching to these grants was the supply of copies of journals under the free quota system, which was expanded to make a greater number available in future to contributing countries. The Review Conference called for an interim conference in 1963 which would in turn appoint an *ad hoc* committee to study the long-term problems of the Commonwealth Agricultural Bureaux with particular reference to the method of determining the units of financial contribution to be assessed to contributing countries, the possibility of locating bureaux and institutes throughout the Commonwealth, the possibility of separating the research and service functions of the three institutes from the CAB organization and making them self-supporting, and the long-term development of the CAB organization.

12. The institutes and bureaux act as effective clearing houses of information for scientists and research workers in agriculture, animal health and forestry throughout the Commonwealth and, increasingly, throughout the world. To do this they collect information by scanning and indexing as far as possible all journals in their subjects in all languages, by scanning other abstracts, and by keeping in touch with research in progress. They distribute this information by the periodical issue of 16 abstract journals, by the frequent issue of monographs reviewing some particular subject within their field and by various other publications.

13. Apart from the printed record, the institutes and bureaux serve as intelligence centres in a variety of other ways. They may answer individual inquiries, an activity

that ranges from supplying a few references to furnishing a bibliography, a basic library list, or a memorandum of digested information. Several bureaux may co-operate in this, particularly where information marginal to their interest is concerned. They may also supply reprints, photo-reproductions or microfilms of material inaccessible to an inquirer. They also assist research workers by giving information about research centres, by arranging meetings between workers in different parts of the Commonwealth, by arranging the exchange of experimental material between workers, by giving information on post-graduate study, on the sources of supply of apparatus and equipment, and so on. In addition the reviews of progress in the agricultural sciences, as published in the Annual Reports, are designed to keep scientists informed of the most recent advances in their subjects. It is stressed that any scientist is free to send inquiries straight to the Director concerned. The Institute of Entomology and the Mycological Institute have the important additional duty of identification, each in its own field.

14. The Institute of Entomology maintains no collection of its own, as its work is integrated very closely with the British Museum, but the Mycological Institute keeps its own working herbarium which now contains some 85,000 specimens. It also maintains the United Kingdom national collection of type cultures for all fungi except medical fungi, timber rotting fungi and yeasts.

15. The Institute of Biological Control prepares and maintains a catalogue of the parasites and predators of the insects of the world. Part 5 of Section 2 is the last published. The principal activity of this institute is, however, in the practical field. It consists mainly of the supply of beneficial insects attacking various pests. This requires field survey collections and sometimes mass breeding and the developments of special methods of shipment. There are stations in Europe, India, Pakistan, West Indies, East Africa and the United States. In addition to the supply of parasite material, the institute takes complete charge of biological control projects for governments. The institute also carries out research and educational work.

16. A brief summary of the work carried out at the institutes and bureaux during the year under review is given on pages 25–47.

17. The organizations under the administration of the Executive Council are:

The Commonwealth Institute of Entomology
The Commonwealth Mycological Institute
The Commonwealth Institute of Biological Control
The Commonwealth Bureaux of:
- Animal Breeding and Genetics
- Animal Health
- Animal Nutrition
- Dairy Science and Technology
- Forestry
- Helminthology
- Horticulture and Plantation Crops
- Pastures and Field Crops
- Plant Breeding and Genetics
- Soils

18. A Liaison Officer appointed by the appropriate department of each participating country keeps in touch with administrative matters, and in each country for each bureau a scientific officer is nominated as Official Correspondent to be the 'general friend' on scientific matters of that bureau in that country. A few bureaux also nominate Foreign Correspondents who are really the equivalent of Official Correspondents in foreign countries. The Secretary and each Director also has an opposite number named in FAO with whom he corresponds directly. The Heads of the several institutes at which bureaux are located act as Consultant Directors of the Bureaux thus giving the Council and bureaux the benefit of their wide experience and scientific knowledge. Together they constitute the Scientific Advisory Committee. All other officers are whole-time servants of the Executive Council.

APPENDIX II

List of Review Articles published in the
1961 *volumes of the Abstract Journals*

Journal	*Title*
Animal Breeding Abstracts	Climate physiology of sheep (Vol. 29, No. 1).
	Biochemical polymorphism in farm animals (Vol. 29, No. 2).
	Genetics of mammalian gametes (Vol. 29, No. 3).
	Comparative physiological effects of cold on farm and laboratory animals (Vol. 29, No. 4).
Veterinary Reviews and Annotations	Microbiological aspects of Corynebacterium renale (Vol. 7, Part 1).
	Salmonellosis in pigs with reference to its public health significance (Vol. 7, Part 1).
	The Bovine uterus—Histopathology (Vol. 7, Part 1).
	Microbiological aspects of Listeria monocytogenes with special reference to listeriosis in animals (Vol. 7, Part 2).
	Vibrio fetus infection in sheep (Vol. 7, Part 2).
	The abomasum (Vol. 7, Part 2).
Nutrition Abstracts and Reviews	Inhibitors of vitamins of the B complex (Vol. 31, No. 1).
	Pyridoxine: Metabolism and requirement (Vol. 31, No. 2).
	Statistical studies of recorded energy expenditure of man. Part II: Expenditure on walking related to weight, sex, age, height, speed and gradient. (Vol. 31, No. 3).
	Nutrition: A scheme for classification and coding of information for machine retrieval (Vol. 31, No. 4).

Journal	*Title*
Dairy Science Abstracts	Fallout and man's diet (Vol. 23, No. 1).
	Results of recent dairy research work in Switzerland, 1953–1959 (Vol. 23, No. 2).
	Fluorescence method for the determination of protein in milk (Vol. 23, No. 3).
	The scientific and technical aspects of circulation cleaning in the dairy industry. An interpretive review (Vol. 23, No. 4).
	Rennet substitutes—a review (Vol. 23, No. 5).
	Variations in the chemical composition of the milk of the cow—Parts I and II (Vol. 23, Nos. 6 & 7).
	The origin, development and influence of milk recording in Great Britain and Northern Ireland (Vol. 23, No. 9).
	Recent advances in the physiology and biochemistry of lactation (Vol. 23, No. 11).
	The assessment of quaternary ammonium compounds in dairy hygiene (Vol. 23, No. 12).
Forestry Abstracts	Notes on progress in forest science (Vol. 22, Nos. 1 & 2).
	A summary of information on the control of Loranthaceae in forestry (Vol. 22, No. 3).
Helminthological Abstracts	The bionomics of the free-living stages of zoo-parasitic and phyto-parasitic nematodes—a critical survey (Vol. 30, Part 1).
Herbage Abstracts	Herbage production in Great Britain from leys in the year of sowing (Vol. 31, No. 1).
	Recent advances in studies of the chemical composition and digestibility of herbage. Parts I and II (Vol. 31, Nos. 2 & 3).
	Total available carbohydrates in grasses and legumes (Vol. 31, No. 4).
Field Crop Abstracts	Current agricultural research in Africa on annual field crops and grasslands (Vol. 14, Nos. 1 to 4).
Soils and Fertilizers	The agricultural importance of the soil meso-fauna (Vol. 24, No. 1).
	Extraction of soil organic matter with aqueous solvents (Vol. 24, No. 2).
	Phosphorus in soil organic matter (Vol. 24, No. 3).
	Soil genesis and classification in Central Africa (Vol. 24, No. 4).
	Some recent work on soils of the humid tropics (Vol. 24, No. 5).
	The Summary (Vol. 24, No. 6).

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DISTRIBUTION OF JOURNALS, 1961

APPENDIX III

Details of Distribution by Titles

British Commonwealth & Republics of Sudan and Ireland	SUBSCRIPTION COPIES																			QUOTA FREE AND EXCHANGE COPIES														GRAND TOTAL
	Review of Applied Entomology Series A.	Review of Applied Entomology Series B.	Bulletin of Entomological Research	Review of Applied Mycology	Animal Breeding Abstracts	Veterinary Bulletin	Index Veterinarius	Veterinary Reviews & Annotations	Nutrition Abstracts & Reviews	Dairy Science Abstracts	Forestry Abstracts	Helminthological Abstracts	Horticultural Abstracts	Herbage Abstracts	Field Crop Abstracts	Plant Breeding Abstracts	Soils & Fertilizers	TOTAL	Review of Applied Entomology Series A.	Review of Applied Entomology Series B.	Bulletin of Entomological Research	Review of Applied Mycology	Animal Breeding Abstracts	Veterinary Bulletin	Index Veterinarius	Veterinary Reviews & Annotations	Nutrition Abstracts & Reviews	Dairy Science Abstracts	Forestry Abstracts	Helminthological Abstracts	Horticultural Abstracts	Herbage Abstracts	Field Crop Abstracts	Plant Breeding Abstracts	Soils & Fertilizers	TOTAL	
United Kingdom	138	111	102	159	153	229	83	133	277	240	84	89	242	134	130	105	145	2,554	61	52	47	78	63	58	11	42	93	53	68	57	69	81	72	50	86	1041	3,595
Canada	38	29	36	45	18	30	12	13	58	30	64	12	37	27	23	40	39	551	39	35	14	16	24	25	—	24	27	17	36	23	37	28	19	34	26	424	975
Australia	50	42	40	52	57	83	29	29	71	67	81	33	82	91	77	50	99	1,033	30	29	26	25	26	25	—	26	29	27	25	25	25	27	25	25	25	420	1,453
New Zealand	7	6	6	9	7	55	6	11	12	38	19	8	26	16	10	6	24	266	10	11	8	10	9	12	—	10	9	9	15	9	13	11	8	11	11	166	432
Union of South Africa*	47	34	24	28	30	20	5	6	31	20	14	10	25	19	11	11	26	361	1	1	22	10	12	27	—	8	15	14	16	5	13	15	10	13	18	200	561
India	81	61	57	96	53	41	19	16	85	42	25	29	60	40	37	76	88	906	12	11	8	9	5	5	—	4	12	8	4	3	5	7	10	10	14	127	1,033
Pakistan	16	13	21	16	8	3	1	1	17	4	6	3	10	3	7	7	13	149	3	5	5	4	3	3	—	2	3	3	3	2	3	2	3	3	4	51	200
Ceylon	8	7	9	5	3	5	2	1	7	5	3	5	6	2	7	6	10	91	2	2	2	4	1	1	—	2	1	1	1	1	1	1	1	1	1	26	117
Ghana	7	13	14	4	6	5	—	5	4	3	13	3	8	6	9	4	7	111	3	2	2	4	4	5	—	3	3	3	7	3	1	4	3	3	1	48	159
Fed. of Malaya	4	1	4	4	5	9	2	6	5	2	8	3	8	4	4	3	8	80	7	8	6	8	2	6	—	2	2	1	2	5	1	2	4	4	60	140
Nigeria	11	9	14	7	13	20	4	10	7	7	6	7	13	11	14	9	13	175	—	1	2	2	1	4	—	—	2	2	10	2	3	2	1	3	3	38	213
Sierra Leone	1	2	2	2	1	1	—	1	2	—	3	1	4	1	1	1	2	25	2	2	1	2	1	1	—	—	2	—	2	—	1	1	1	1	1	18	43
Tanganyika	3	4	7	2	2	2	2	3	2	2	5	3	7	4	4	4	9	65	7	5	4	2	1	2	—	—	2	2	3	—	2	2	1	1	1	35	100
Fed. of Rhodesia & Nyasaland	10	8	9	5	12	14	3	12	9	9	22	7	22	17	24	9	23	215	7	4	4	4	4	4	—	4	4	4	4	4	4	4	4	4	4	67	282
Dependent Territories	30	24	32	14	21	39	11	21	19	17	36	15	40	33	24	22	46	444	35	39	36	33	19	24	—	2	15	17	20	13	36	21	30	26	36	402	846
Rep. of the Sudan	6	4	5	3	3	1	1	1	—	3	—	2	2	1	8	6	3	49	5	4	2	3	1	2	—	—	3	1	3	2	3	3	—	1	1	34	83
Rep. of Ireland	2	1	1	6	10	8	4	3	9	11	3	12	9	23	16	9	11	138	2	4	2	3	3	3	—	3	9	3	5	2	2	3	2	2	4	52	190
TOTAL	459	369	383	457	402	565	184	272	615	500	392	242	601	432	406	368	566	7,213	226	215	191	220	179	207	11	127	231	166	223	153	223	213	192	192	240	3209	10,422
USSR	54	24	26	49	44	30	13	8	37	33	40	29	33	15	14	33	49	531	6	7	3	1	2	1	1	—	—	1	3	1	1	4	2	5	1	39	570
Rest of Europe	348	178	167	391	273	332	86	100	493	287	195	112	324	174	147	297	336	4,240	72	45	35	24	14	46	—	15	54	15	17	7	60	35	36	35	24	534	4,774
China	6	9	5	20	10	44	14	21	72	26	15	69	6	8	7	9	8	349	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	3	352
Japan	99	52	41	130	61	43	—	8	63	45	45	37	53	22	27	87	63	876	7	3	3	1	1	3	—	3	4	1	—	—	6	1	4	2	1	40	916
Rest of Asia	68	51	63	51	40	38	10	14	53	27	24	31	55	26	33	51	54	689	5	6	2	4	—	5	—	—	3	—	1	—	11	3	1	3	—	44	733
Africa	49	43	56	20	13	23	8	7	19	14	29	1	15	24	25	27	40	413	4	4	4	3	—	1	—	—	—	—	—	—	5	2	1	—	3	27	440
USA	219	234	177	352	197	229	108	90	504	931	221	212	199	137	103	207	202	4,322	19	11	10	20	4	11	2	5	12	3	4	5	19	7	10	10	6	158	4,480
Rest of C. & N. America	18	11	14	12	11	13	5	—	9	9	9	10	15	12	9	14	14	185	2	7	1	—	—	—	—	1	—	—	—	1	—	—	—	1	2	15	200
S. America	61	51	43	63	78	63	12	14	59	37	26	33	53	58	42	60	60	813	9	7	6	4	—	8	—	2	6	1	1	2	7	8	9	4	1	75	888
Pacific Area	5	3	4	6	2	2	1	1	3	—	3	2	4	1	2	4	3	46	—	—	—	1	—	2	—	—	—	—	—	—	3	—	—	—	—	6	52
TOTAL	927	656	596	1094	729	817	257	263	1312	1409	607	536	757	477	409	789	829	12,464	124	91	64	58	21	77	3	26	79	21	26	16	112	60	63	61	39	941	13,405
GRAND TOTAL	1386	1025	979	1551	1131	1382	441	535	1927	1909	999	778	1358	909	815	1157	1395	19,677	350	306	255	278	200	284	14	153	310	187	249	169	335	273	255	253	279	4210	23,827

* The records for the Union of South Africa (now the Republic of South Africa) have been included since, at the beginning of 1961, it was not foreseen that South Africa would not remain a Member of the Commonwealth. When notice of its withdrawal from CAB was received at the beginning of June, 1961, it was decided to leave the South African records under the Commonwealth for the year 1961, and to change them over at the beginning of 1962.

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